



# Massachusetts Avenue Bus Priority Pilot

Public Meeting

May 16, 2018

# Meeting Overview

- Introductions and Welcome
- What is Bus Rapid Transit?
- Transit Signal Priority
- Questions and Answers
- Wrap Up



Massachusetts Bay  
Transportation Authority



**ITDP**  
Institute for Transportation  
& Development Policy



# Arlington BRT Bus Priority Pilot Project

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*Barr Foundation provided Arlington a planning and pilot implementation grant to enhance bus service and pilot bus priority through the Mass Ave corridor. Town will test interventions to help improve traffic flow, reduce travel time, and increase reliability.*

## Pilot

- No construction; cones, signal changes, signs, education and enforcement
- One month during morning commute eastbound - intended to test and evaluate

## Proposed features

- Mass Ave Eastbound - evaluating from Lake Street to Alewife Brook Parkway (ABP)
- Mass Ave - evaluating signal priority from Mystic Street to ABP
- Bus queue jump lanes - evaluating at 15 intersections along Mass Ave
- Bus stop relocations - evaluating from Lake Street to ABP



# Outreach / Implementation / Evaluation Timeline

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<b>April-June:</b>	Field Work and Data Collection, including stakeholder meetings
<b>May 16:</b>	<b>BRT Educational Forum</b>
<b>June-August:</b>	Corridor Scenario Development (Conceptual Design of Dedicated Bus Lane, Queue Jumps, Bus Stop Relocation and Related Improvements)
<b>August-September:</b>	Implementation (finalize design and prepare for implementation, engage street teams)
<b>August 15:</b>	<b>Alternative Scenarios Forum</b>
<b>October:</b>	Bus Optimization Pilot
<b>November-December:</b>	Pilot Evaluation
<b>November 12:</b>	<b>Tentative date for Final Forum</b>
<b>May-October:</b>	<b>Stakeholder Meetings in East Arlington</b>



# **What is** **Bus Rapid Transit?**

**Julia Wallerice, ITDP North America (Boston)**





Institute for Transportation  
& Development Policy

Promoting equitable and sustainable  
transportation worldwide

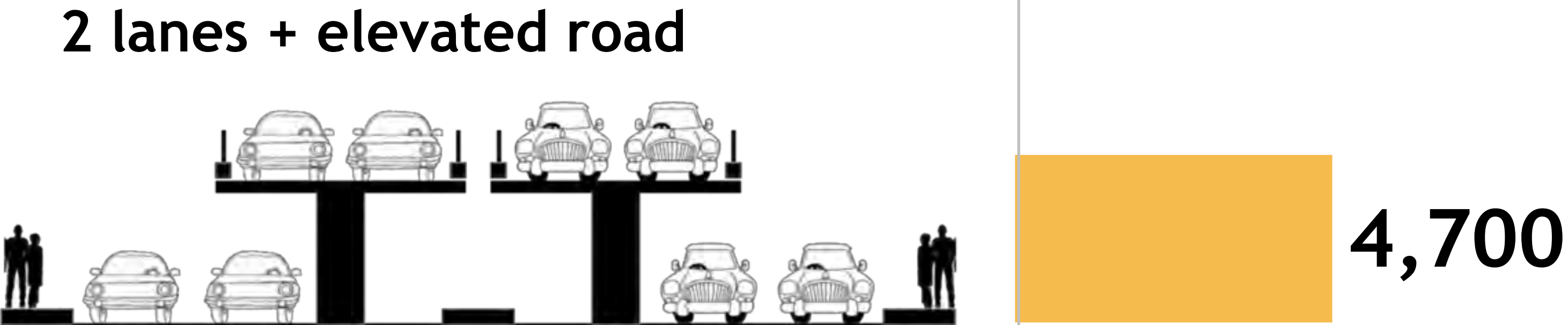
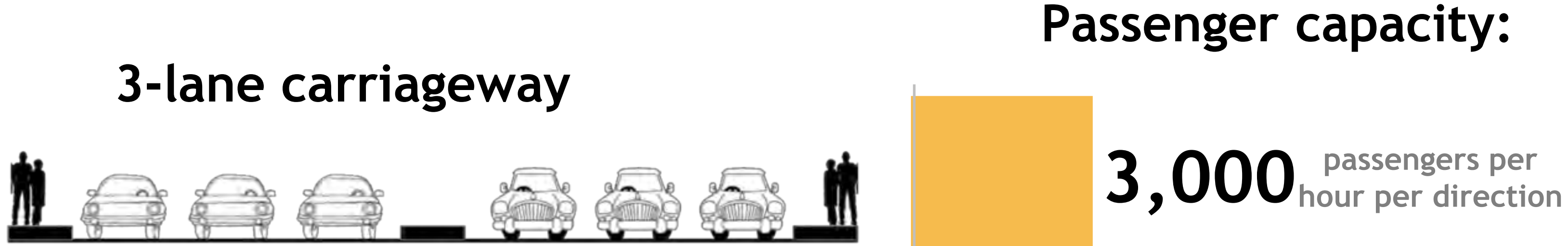








# Using road space efficiently





# Why Buses for Boston?

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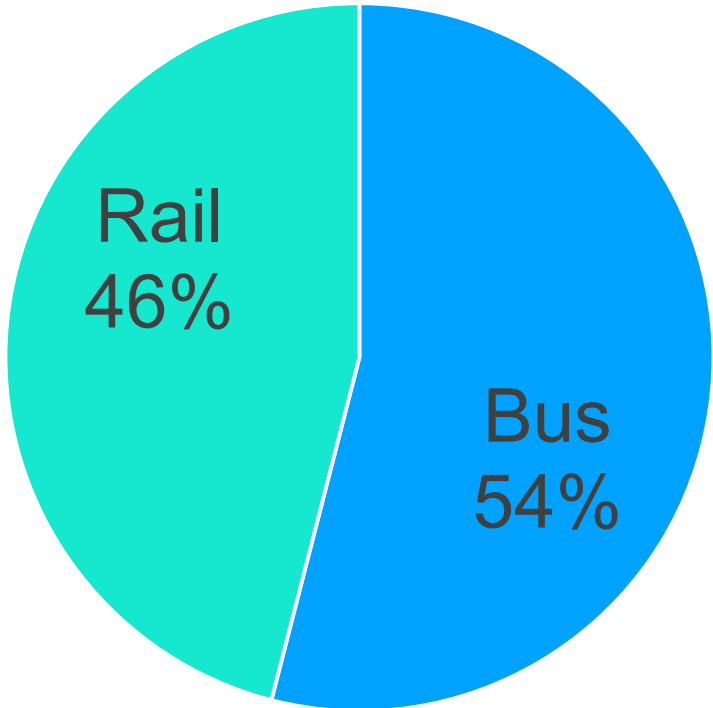
- The region is growing economically and regional traffic is increasing
- Public transit is the most efficient way to capture and serve that growth in a sustainable way, reduce congestion, relieve demand for parking
- A 30% increase in transit trips in the region is predicted by 2035 (LRTP)
- Bus service is the “easiest” to expand and is the most local service, **but suffers from significant delay and reliability challenges**



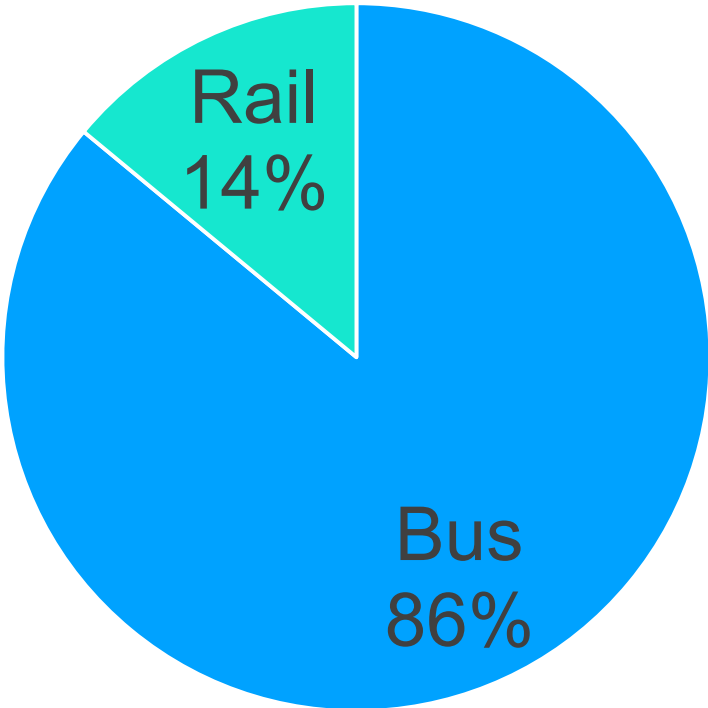
# Buses carry most public transport trips, even in cities with large rail networks



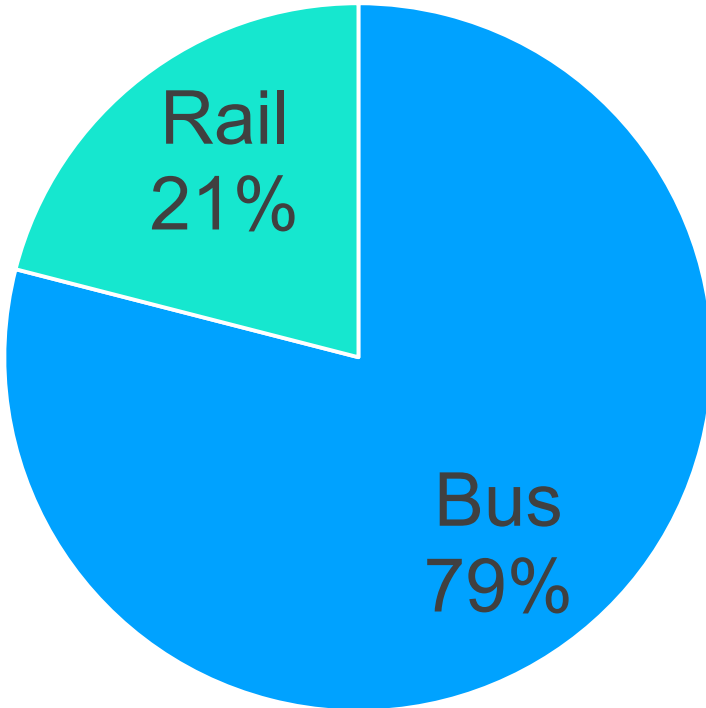
London



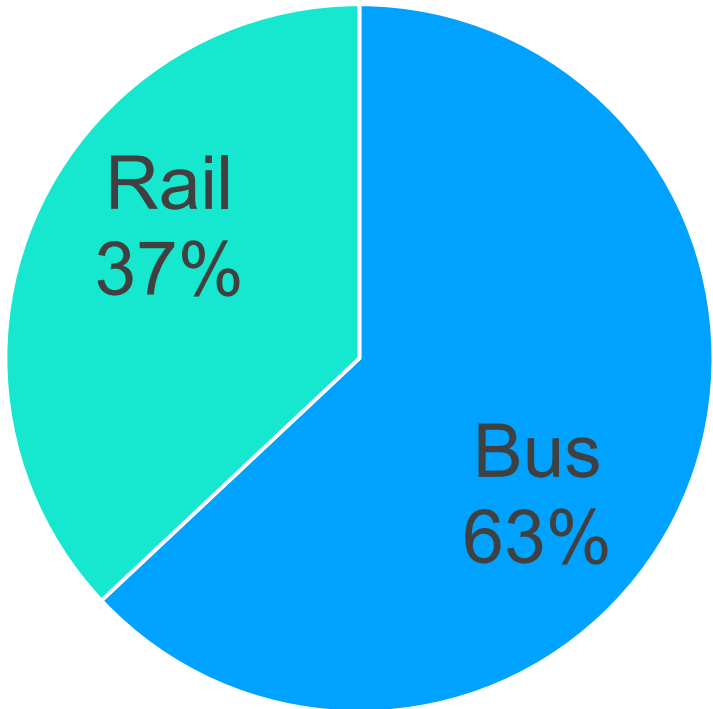
Mexico City



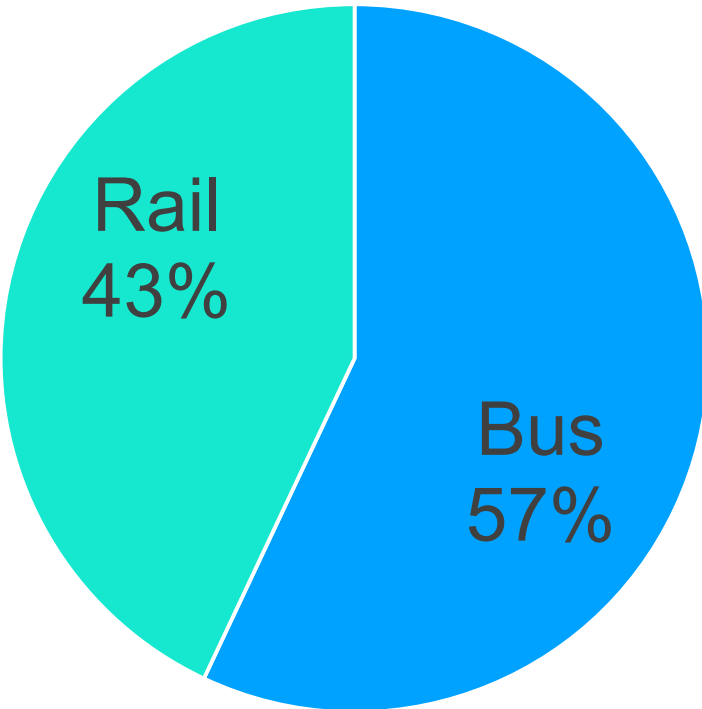
Chennai



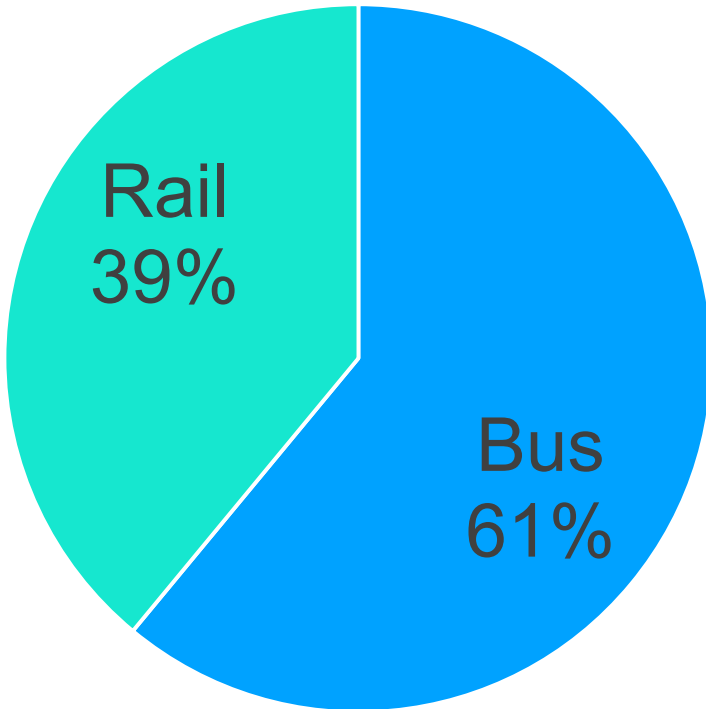
Sao Paulo



Hong Kong



Singapore

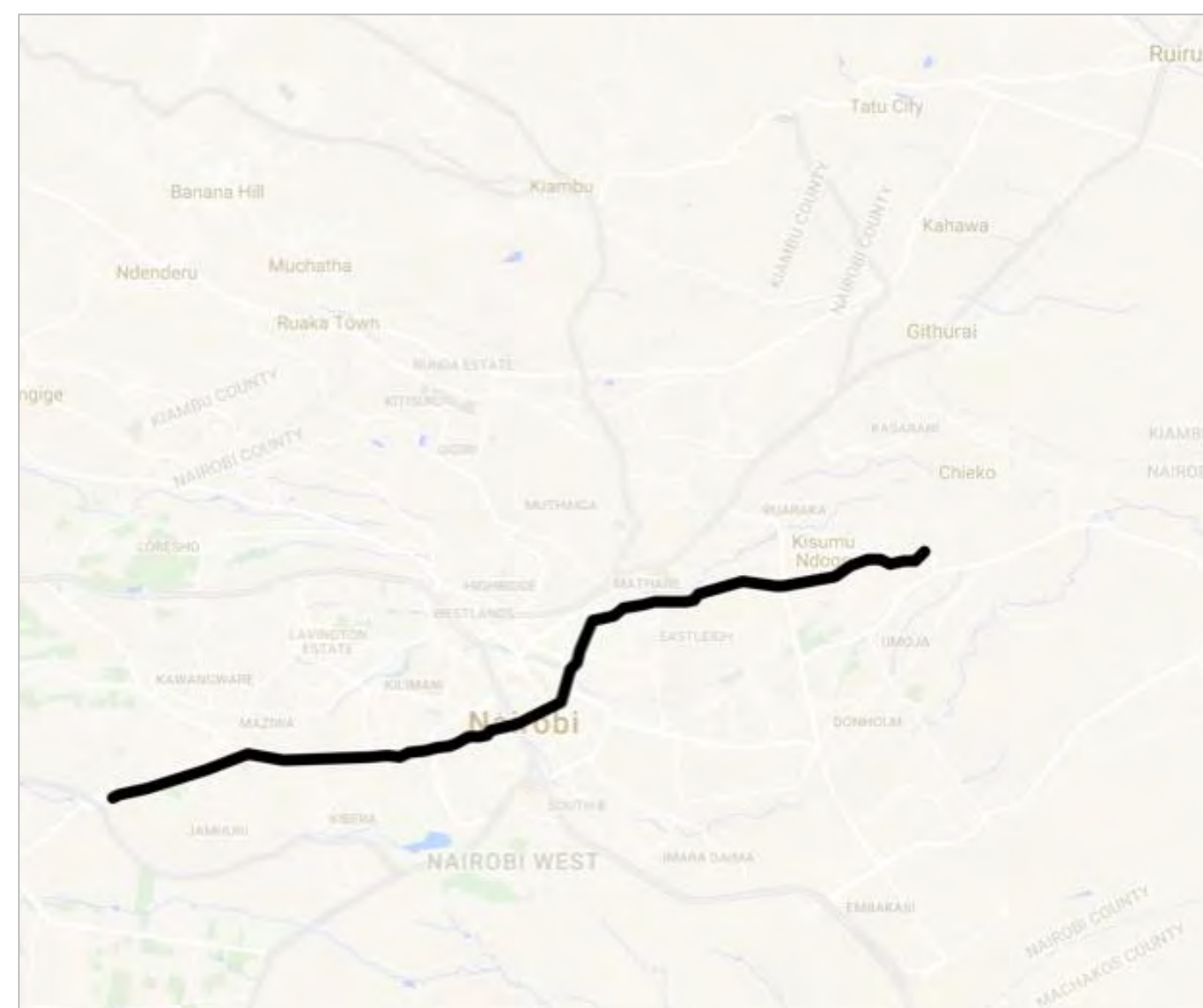


# What can be built with \$1 billion?

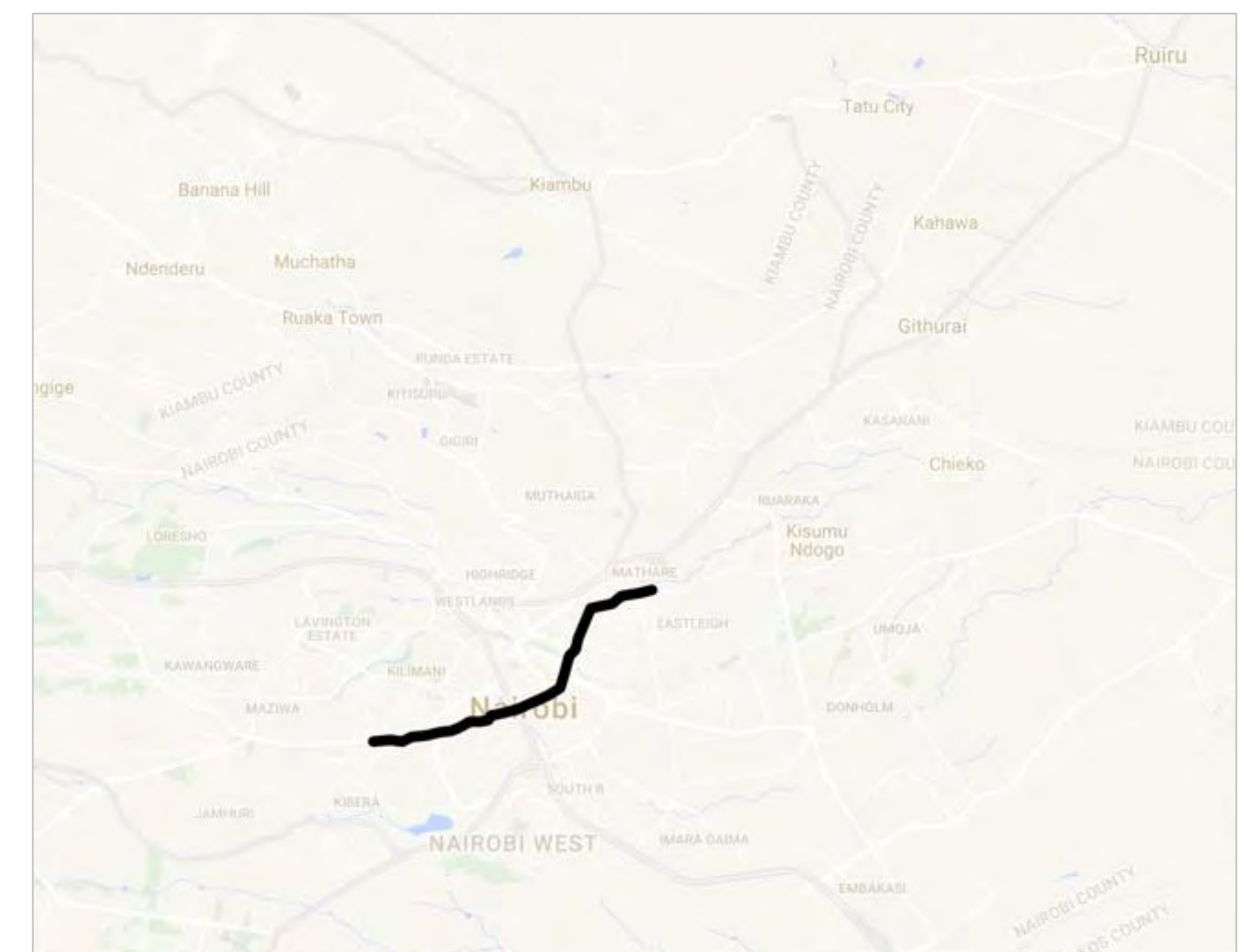
Average construction cost in 2013 USD from a sample of 146 rapid transit projects



**86 km of BRT**



**22 km of LRT**



**9 km of metro**



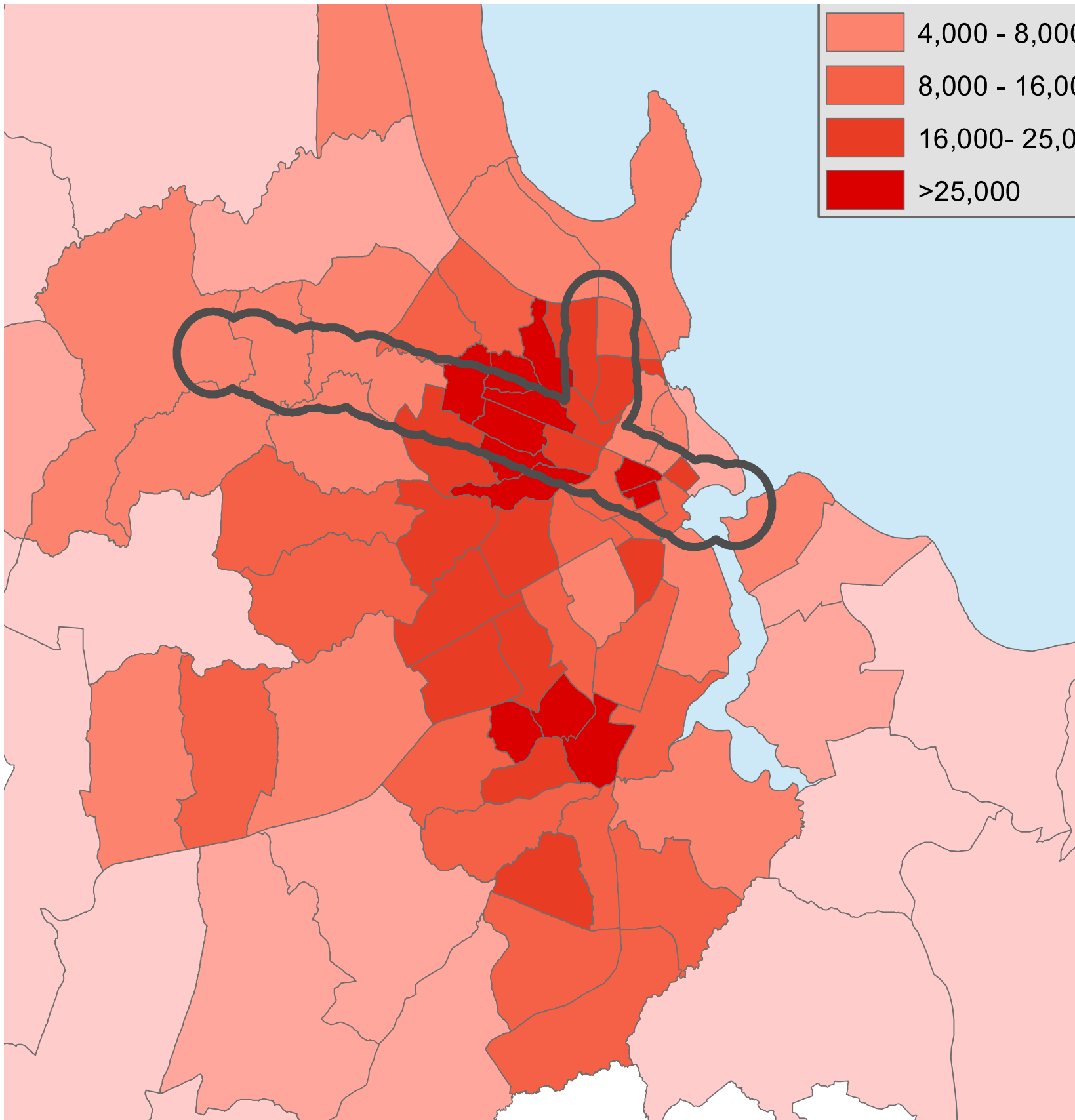
# DART BRT, Dar es Salaam: 21 km phase 1 network

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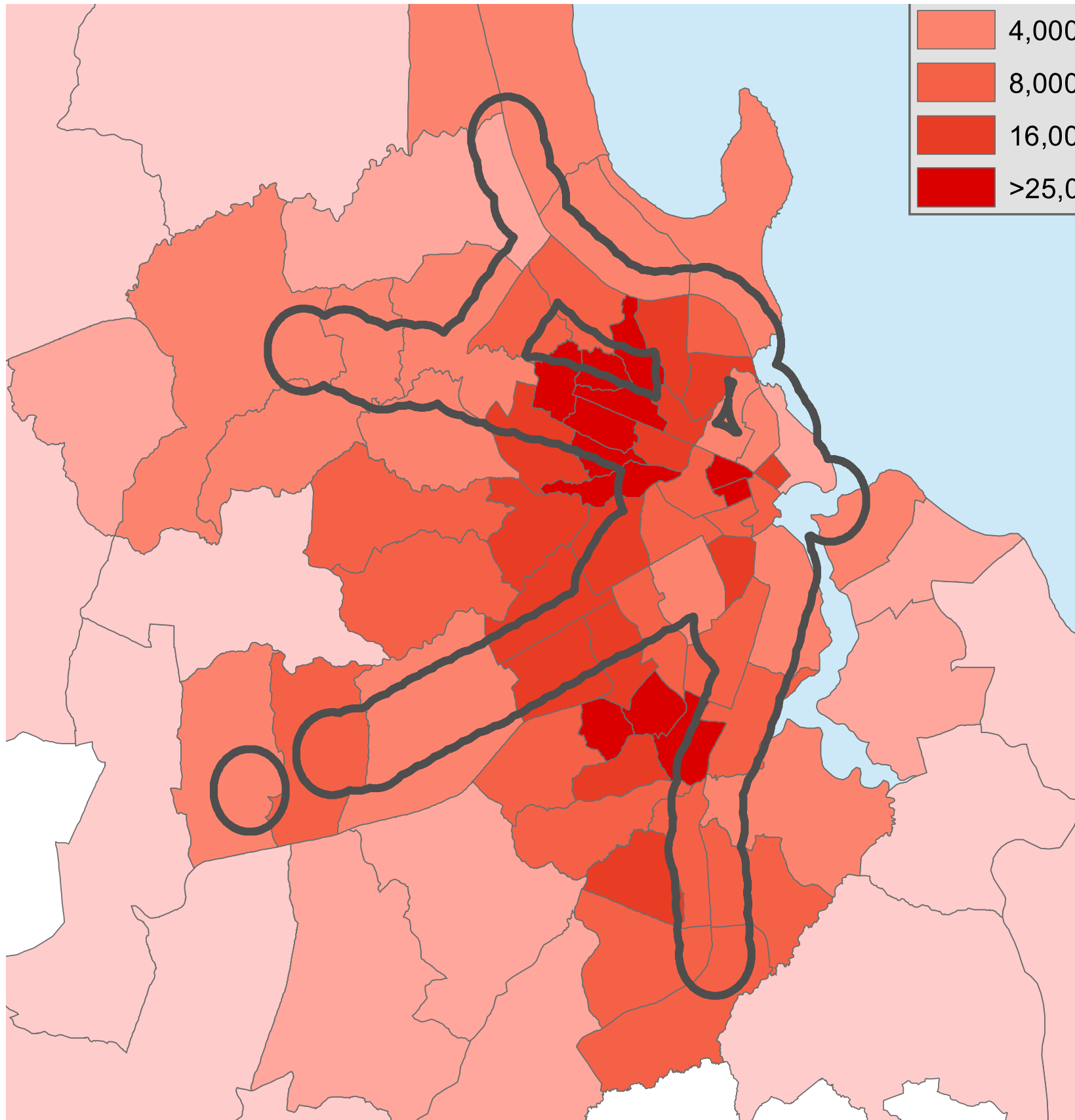




# Rapid transit coverage in Dar es Salaam



**After BRT phase 1**  
**8% of residents near**  
**rapid transit**



**After BRT phases 1-4**  
**33% of residents near**  
**rapid transit**



# Bus Rapid Transit

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- High capacity
- High speed
- Customer oriented
- Not an old bus running in a bus lane!





# Bus Rapid Transit

The only solution is public transport, not just for those with lower incomes, but for everybody.





# The BRT Basics



Dedicated right-of-way



Busway alignment



Platform-level boarding



Off-board fare collection



Intersection treatments

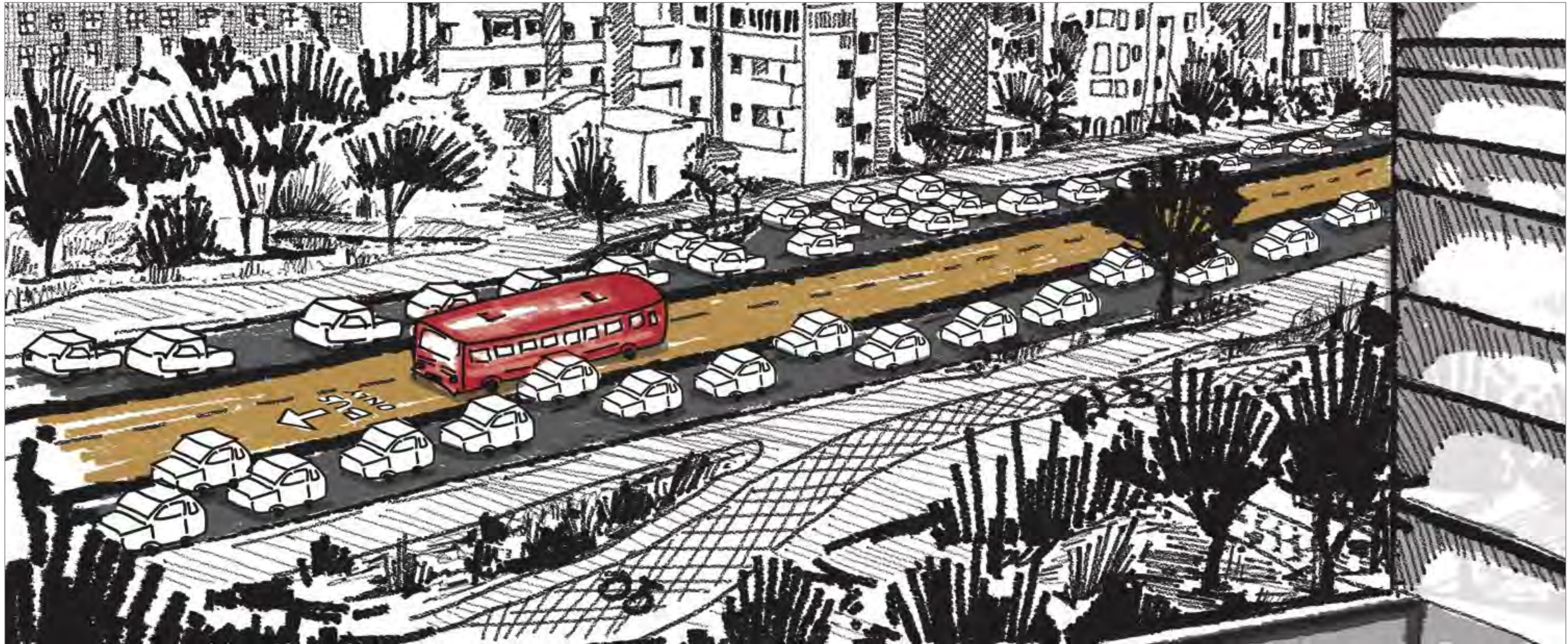




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# BRT Basics: Dedicated right-of-way

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# Dedicated right-of-way

Dedicated BRT lanes are critical to system speed & capacity

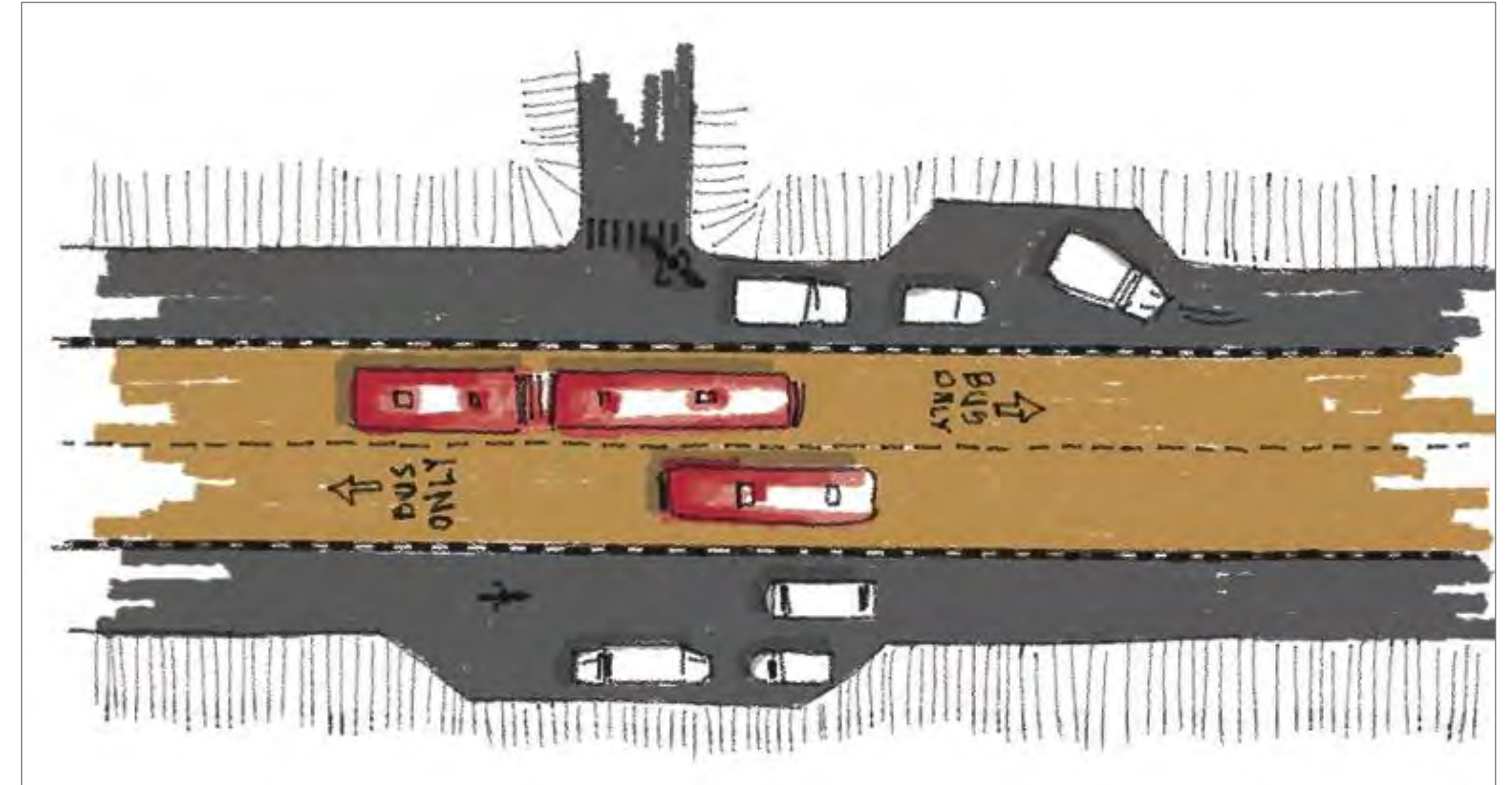
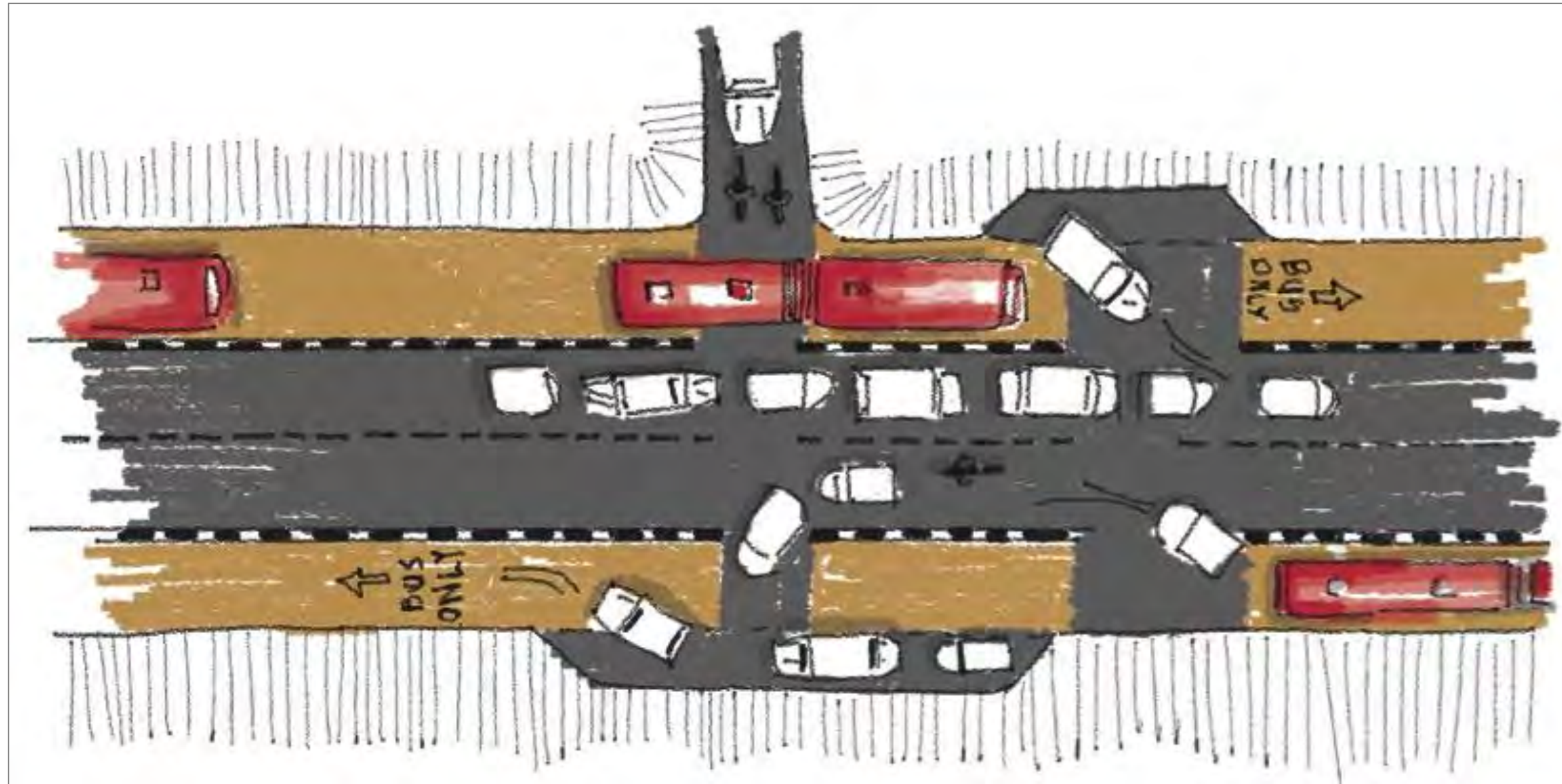


Dar es Salaam



2

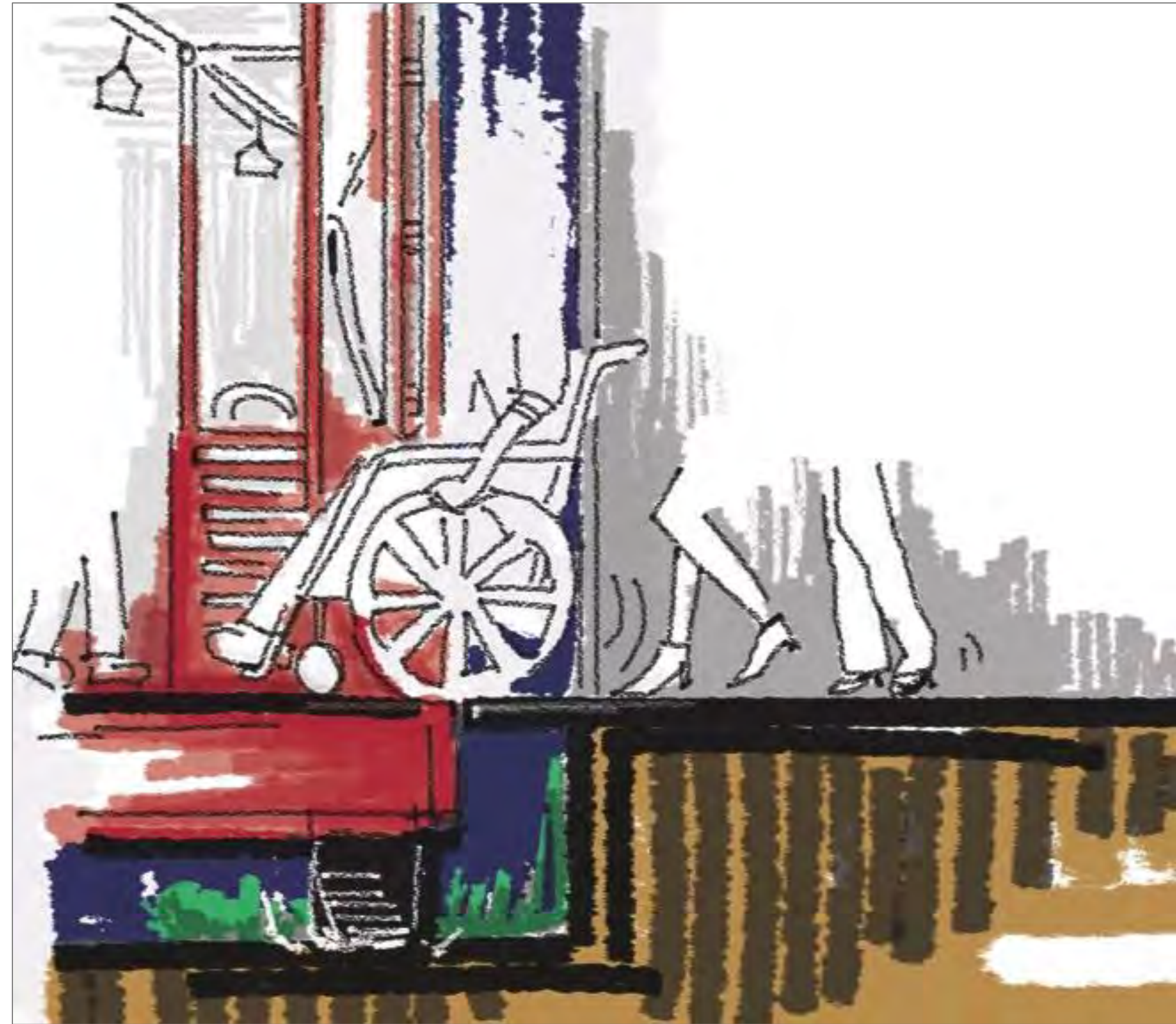
## BRT Basics: Busway alignment





3

## BRT Basics: Platform-level Boarding





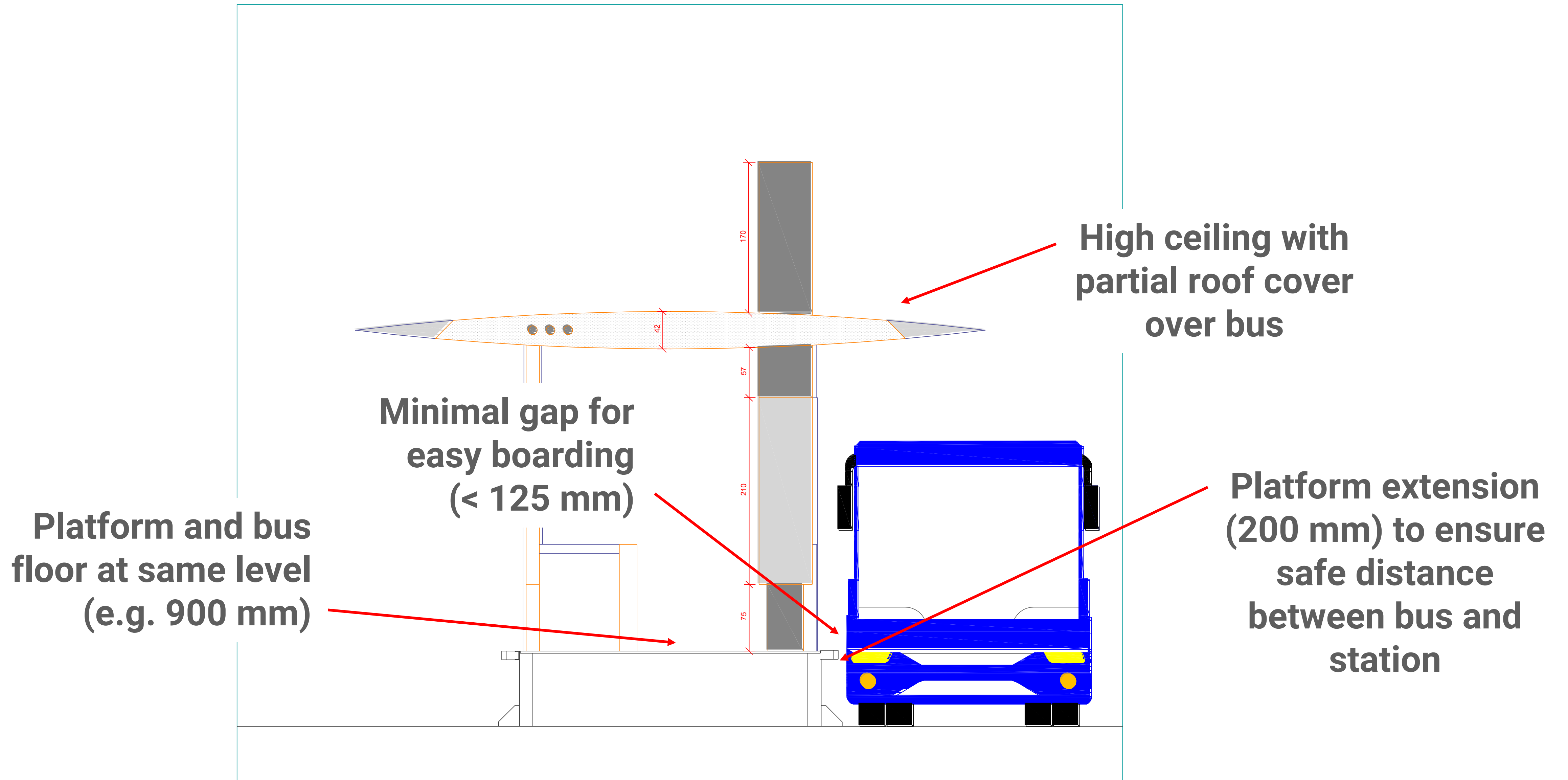
# Platform-level boarding at stations

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# Station-bus interface





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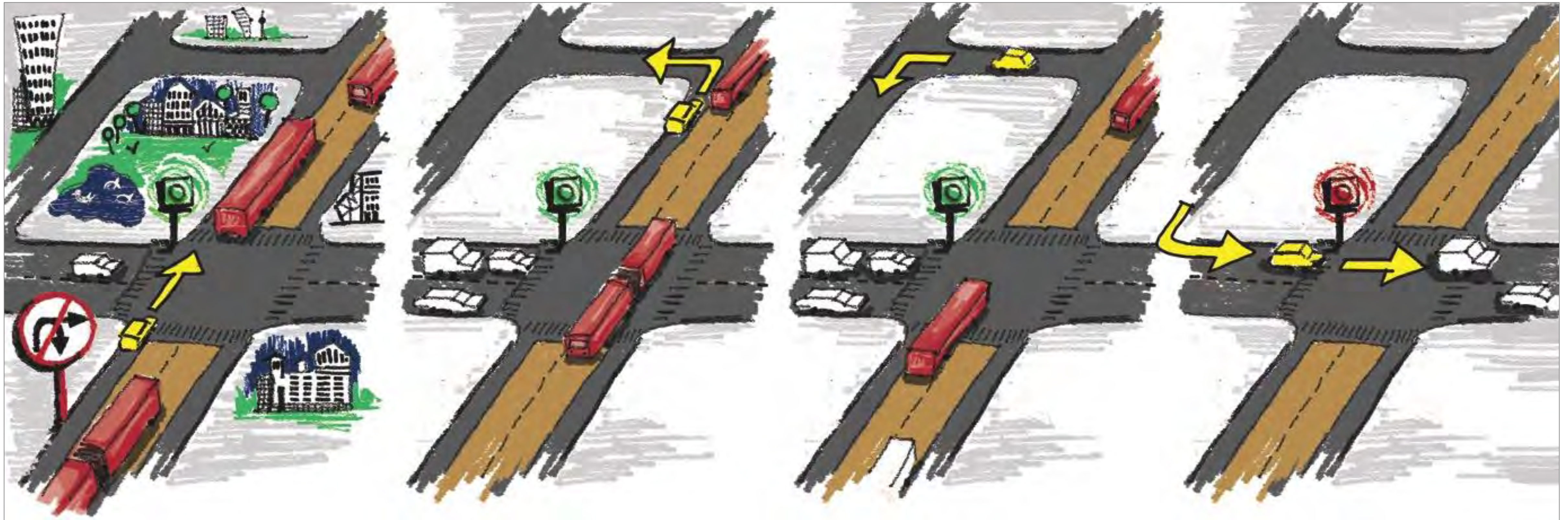
## BRT Basics: Off-board fare





## 5

# BRT Basics: Intersection treatments





# Summary: the BRT Basics

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- ✓ Dedicated right-of-way
- ✓ Busway alignment
- ✓ Off-board fare collection
- ✓ Intersection treatments
- ✓ Platform-level boarding





# Passenger Access

Good walking and cycling facilities to access the BRT system



Dar es Salaam



# Compact transit-oriented development

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# The BRT Standard

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**Gold: 85 points or above**



**Silver: 70–84 points**



**Bronze: 50–69 points**



# BRT in the U.S.

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Health Connector, Cleveland, OH

CT Fast Track, Hartford, CT



Orange Line, Los Angeles, CA





# **Boston BRT Local Pilots 2018: Spotlight on Arlington, Cambridge, Watertown & Everett**

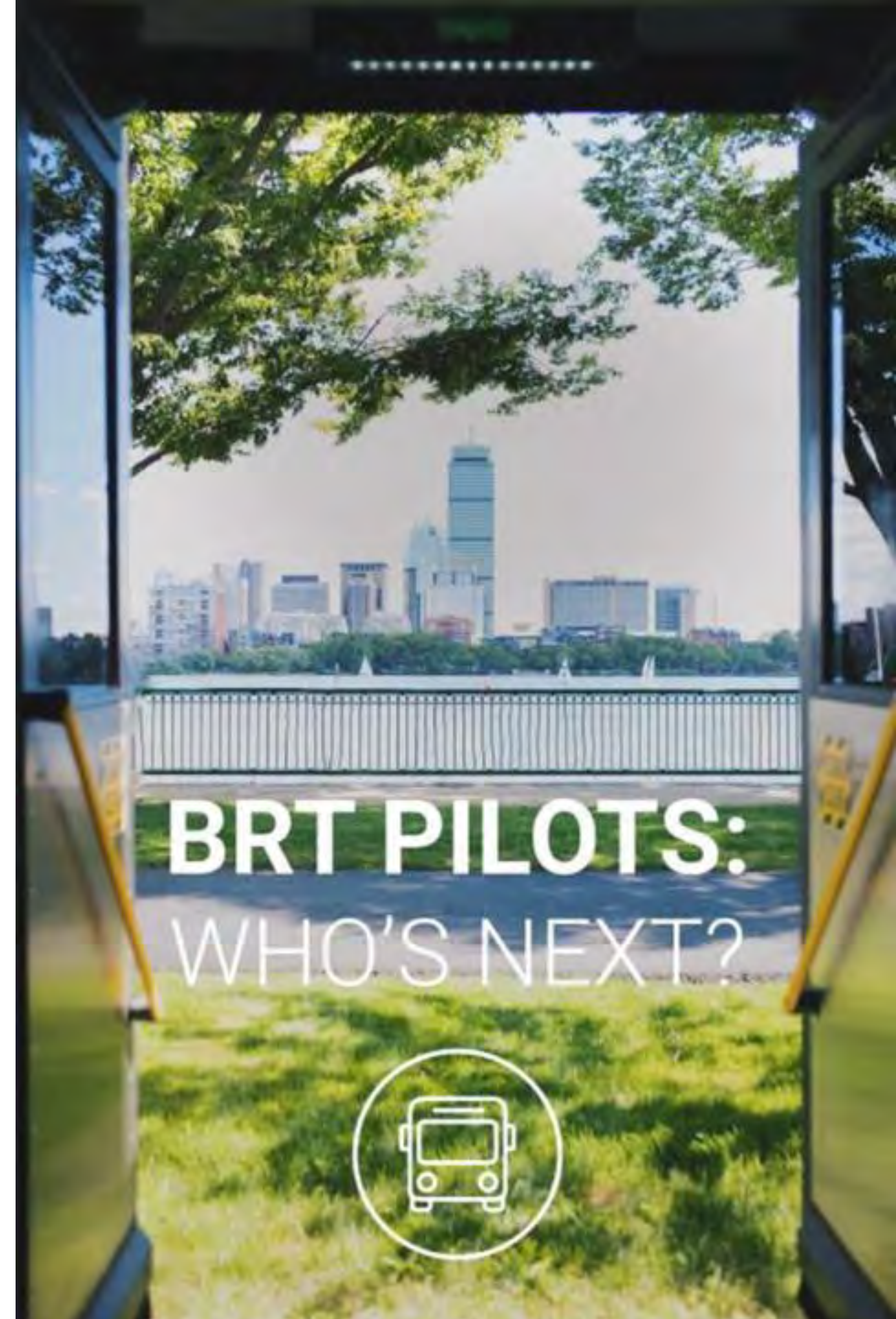




# Boston BRT

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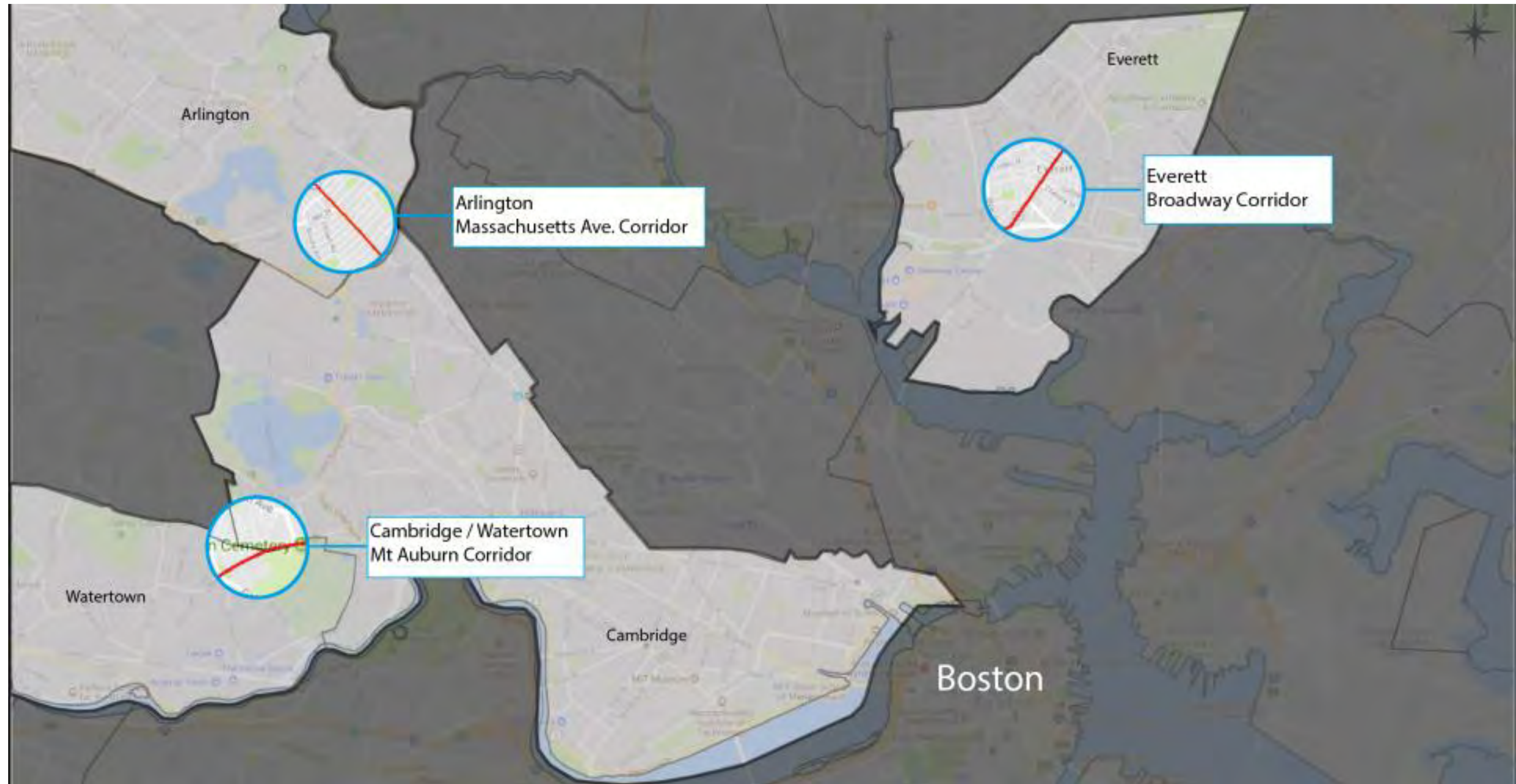
- An initiative developed in 2013 as part of the Barr Foundation's Climate program
- RFP for local pilots grants in early 2017 (up to \$100,000 each) to demonstrate elements of BRT along high ridership corridors





# 2018 Boston BRT Pilots

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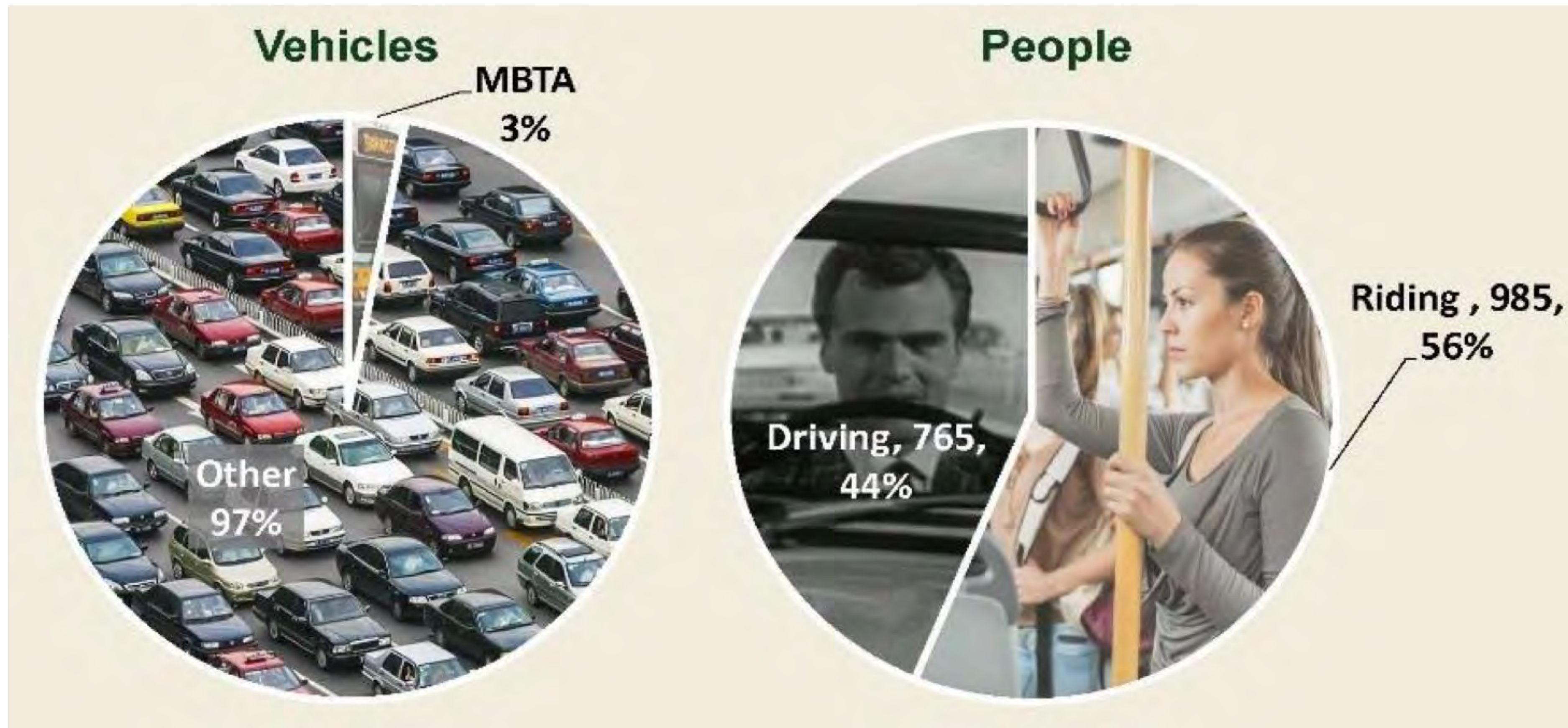


\*Complete corridors not circled in Cambridge/Watertown



# Brattle St. to Coolidge Ave. (AM Peak)

Vehicle Volumes vs. People Volumes on Mt. Auburn St. between Brattle Street and Coolidge Avenue



(Source: DCR Public Presentation, January 10, 2016, Slide 70)

<http://www.mass.gov/eea/agencies/dcr/conservation/planning-and-resource-protection/projects/mount-auburn-street-corridor-study.html>



# Consultant/Technical Support Team

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- ITDP: Julia Wallerice (Boston) & Michael Kodransky (NYC)
  - Project coordination, technical assistance
- Stantec: Ralph DeNisco (formerly Nelson\Nygaard)
  - Technical assistance, analysis
- Denterlein: Katherine Adams, Jayda Leter-Luis
  - Communications, media, PR
- Ad Hoc Industries: Adrian Gill
  - Branding, messaging, graphics



# Bus Priority Pilots on the rise in Boston

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Roslindale Pilot  
(Washington St)



Everett Bus Only  
Lane (Broadway)



Somerville Pilot  
(Prospect St)





**How do we measure our success?  
Lessons learned?**

**Ralph DeNisco, Stantec**






# Why Bus Improvements Matter

## MBTA Website – This Morning

### Route 77

 Delay: Route 77 experiencing 20-25 minute delays due to traffic [+ VIEW](#)

Schedule

Info and Maps

Direction of your trip:  
Inbound → Harvard



Route Variation:  
→ Harvard Station via Mass. Ave.



Source: MBTA Website, 05/16/18, 9:50am



# Arlington – MBTA Frequency

Route 77 – Arlington Heights – Harvard Station  
Route 79 – Arlington Heights – Alewife Station  
Route 350 – North Burlington – Alewife Station

## Route 77

Peak: 8 min  
Off-Peak: 12 min

## Route 79

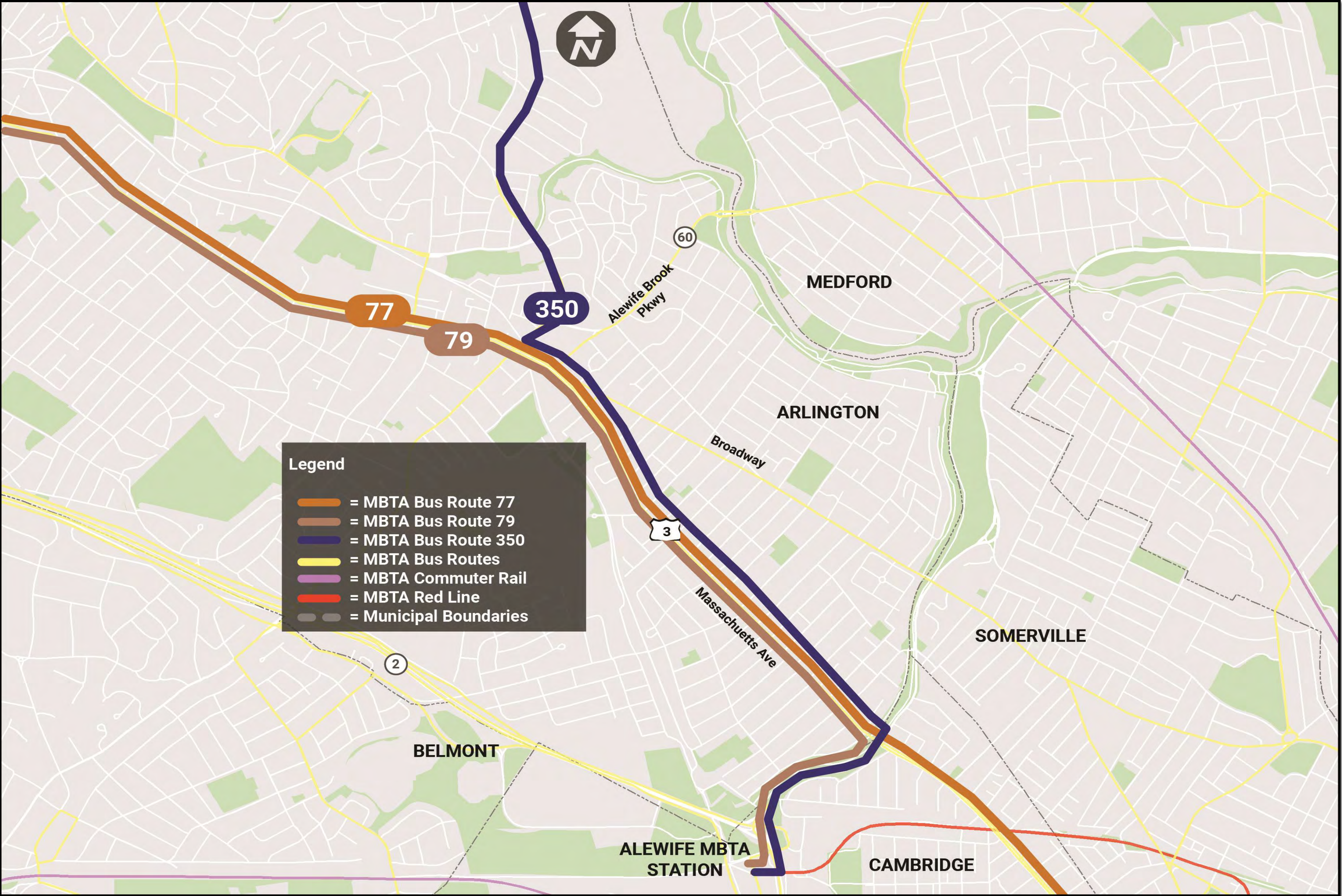
Peak: 20 min  
Off-Peak: 45 min

## Route 350

Peak: 20 min  
Off-Peak: 60 min

## Peak Hour

- 13-14 buses/hr
- Bus every 4-5 minutes





# Arlington – MBTA Ridership

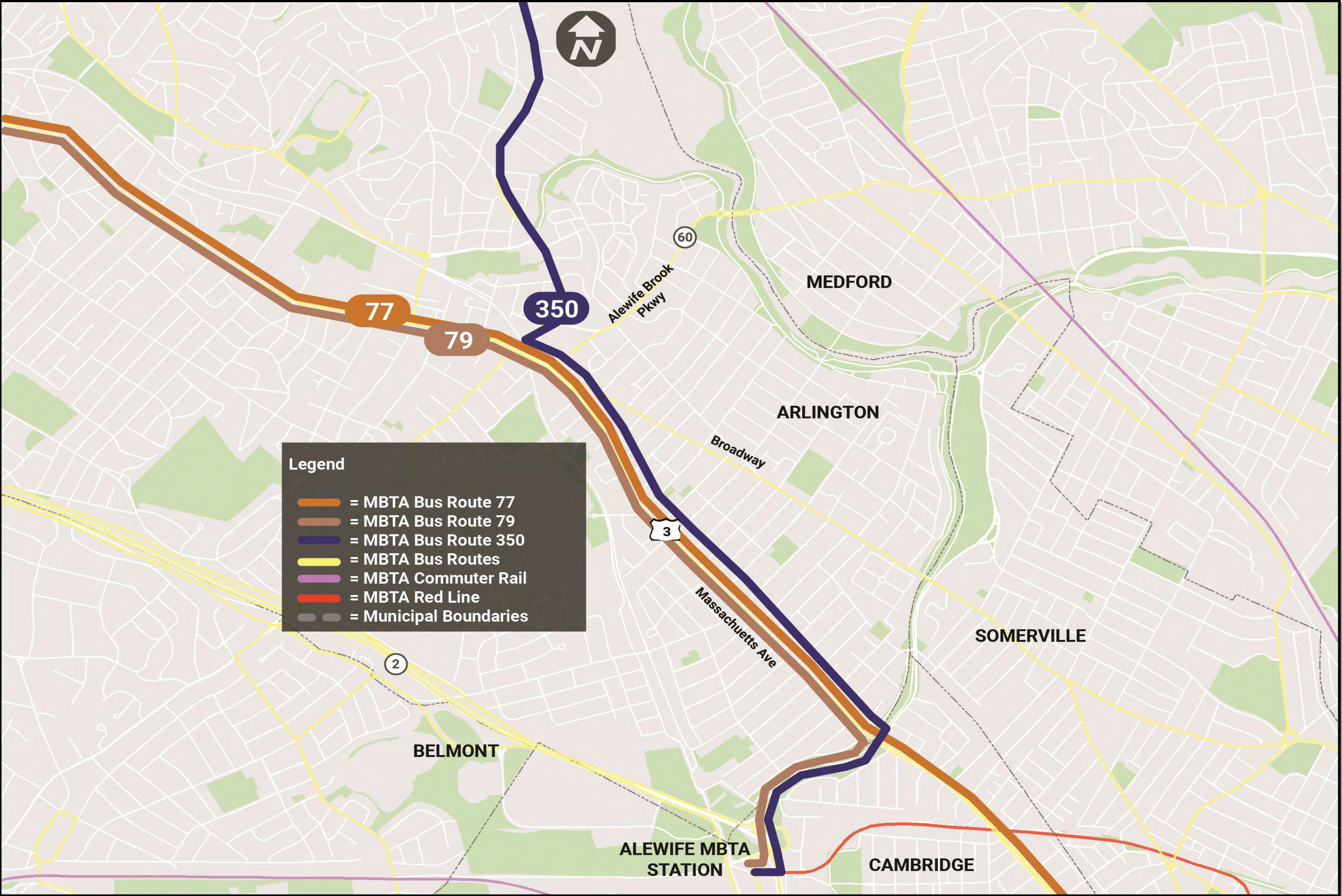
Route 77 – Arlington Heights – Harvard Station  
Route 79 – Arlington Heights – Alewife Station  
Route 350 – North Burlington – Alewife Station

Route 77  
7,600+ riders/day

Route 79  
1,200+ riders/day

Route 350  
1,600+ riders/day

Over 10,000  
riders/day





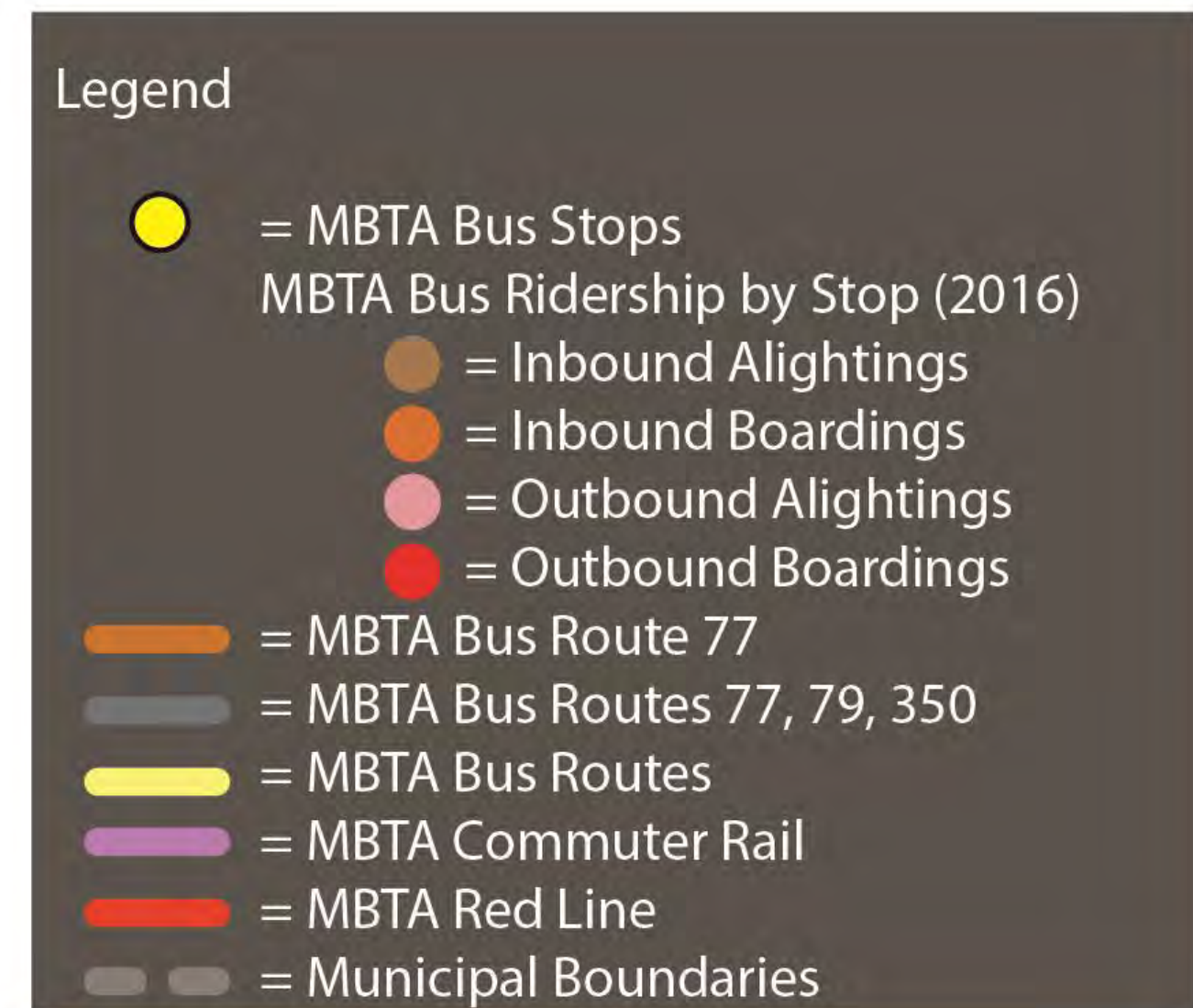
# Arlington – On Time Performance and Ridership

Average Reliability / On Time Performance

	May 10, 2018	Past 7 Days	Past 30 Days
Route 77	77%	76%	78%
Route 79	60%	65%	72%
Route 350	59%	60%	62%

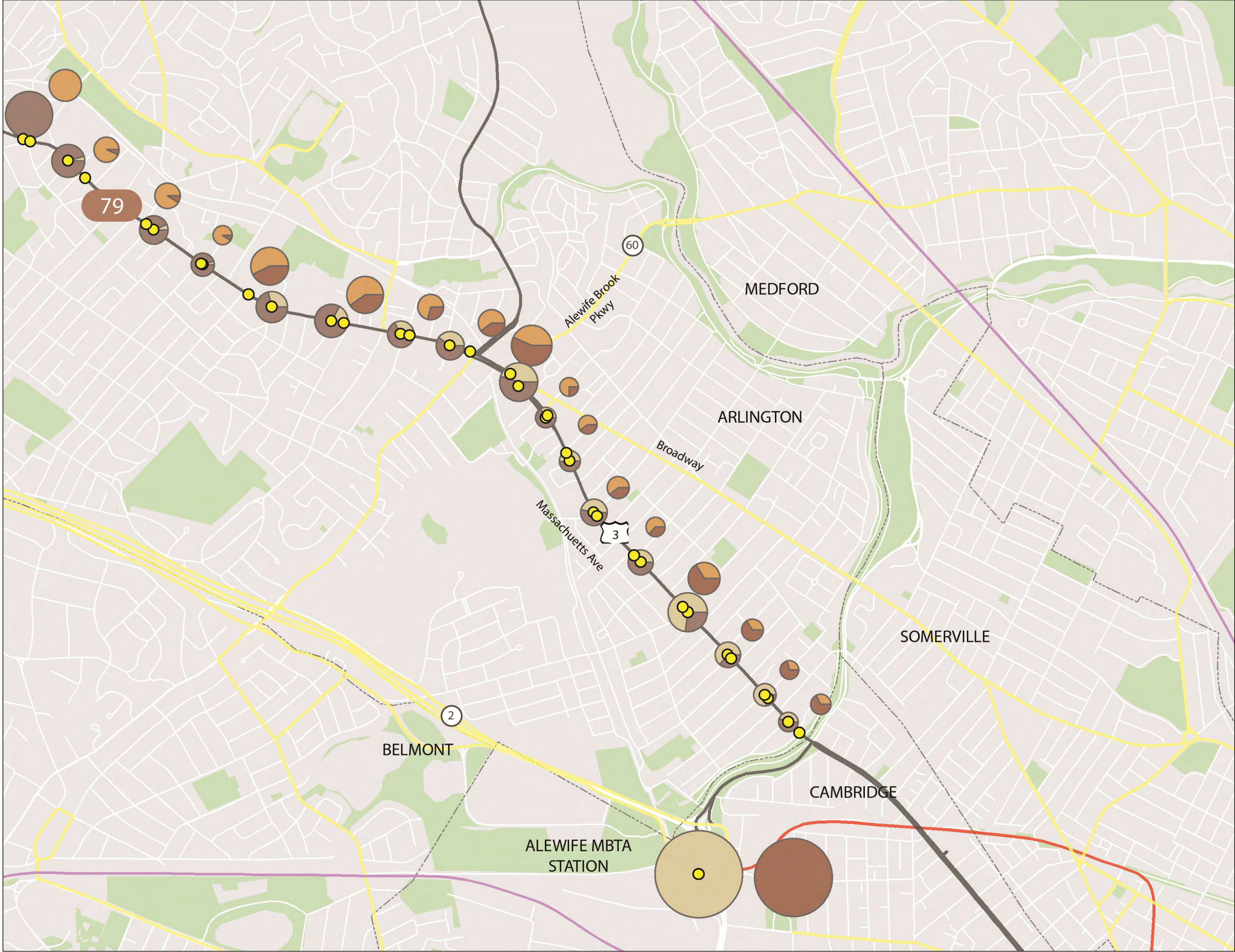


A detailed map of the Alewife MBTA station area, showing the commuter rail line and surrounding neighborhoods. The map includes labels for MEDFORD, ARLINGTON, SOMERVILLE, BELMONT, and CAMBRIDGE. Key roads shown are Alewife Brook Pkwy, Broadway, and Massachusetts Ave. The Alewife MBTA Station is marked near the intersection of Broadway and Massachusetts Ave. The commuter rail line is depicted as a black line with yellow circles representing stations. Pie charts of varying sizes are placed along the line, indicating different data points or segments. A red line represents the MBTA subway line, and a purple line represents the commuter rail line. The map also shows various green spaces and residential areas.





# MBTA Weekday Ridership by Stop (Route 79)

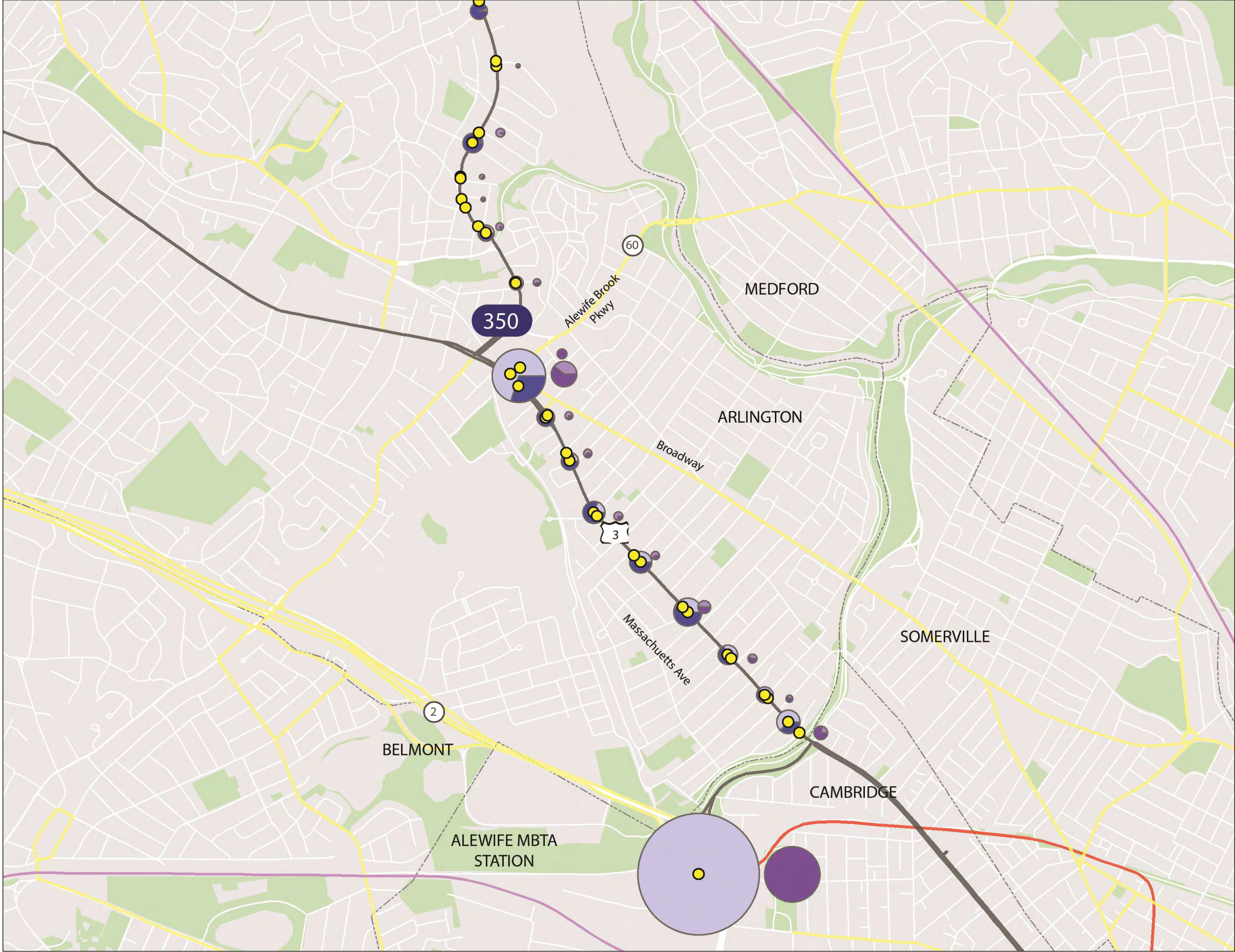


Legend

- = MBTA Bus Stops
- = MBTA Bus Ridership by Stop (2016)
  - = Inbound Alightings
  - = Inbound Boardings
  - = Outbound Alightings
  - = Outbound Boardings
- = MBTA Bus Route 79
- = MBTA Bus Routes 77, 79, 350
- = MBTA Bus Routes
- = MBTA Commuter Rail
- = MBTA Red Line
- = Municipal Boundaries



# MBTA Weekday Ridership by Stop (Route 350)



Legend

- = MBTA Bus Stops
- = Inbound Alightings
- = Inbound Boardings
- = Outbound Alightings
- = Outbound Boardings
- = MBTA Bus Route 350
- = MBTA Bus Routes 77, 79, 350
- = MBTA Bus Routes
- = MBTA Commuter Rail
- = MBTA Red Line
- = Municipal Boundaries



# Arlington Load Factor



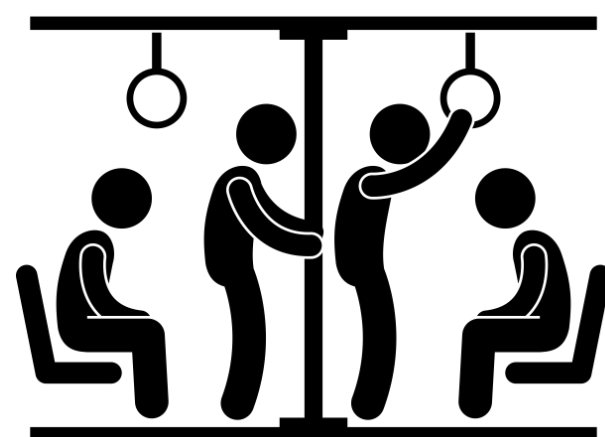


# MBTA Routes 77, 79 & 350

## Riders

More than **1/2** are  
Commuters

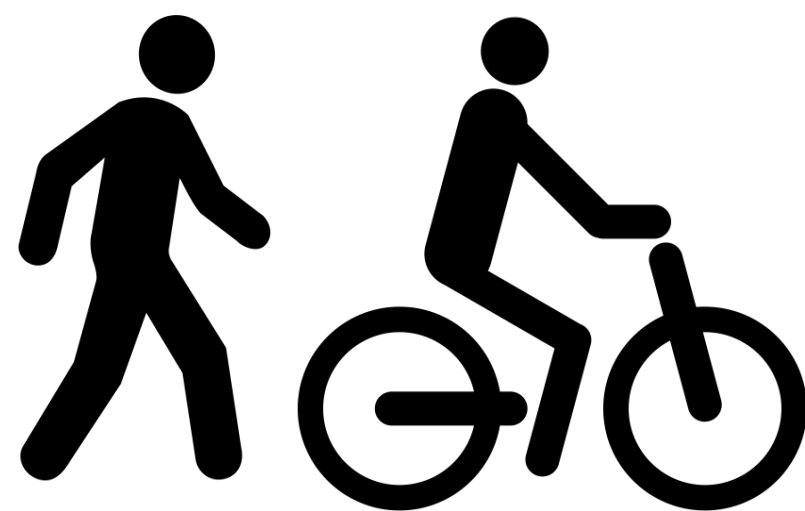
but **56%** of Route 77  
riders are not



**1/3** of the riders are  
Low Income



**97%** of Route 77 & 79 riders  
walk or bike to the bus



**2/3** of Riders have  
access to vehicle





# MBTA Routes 77

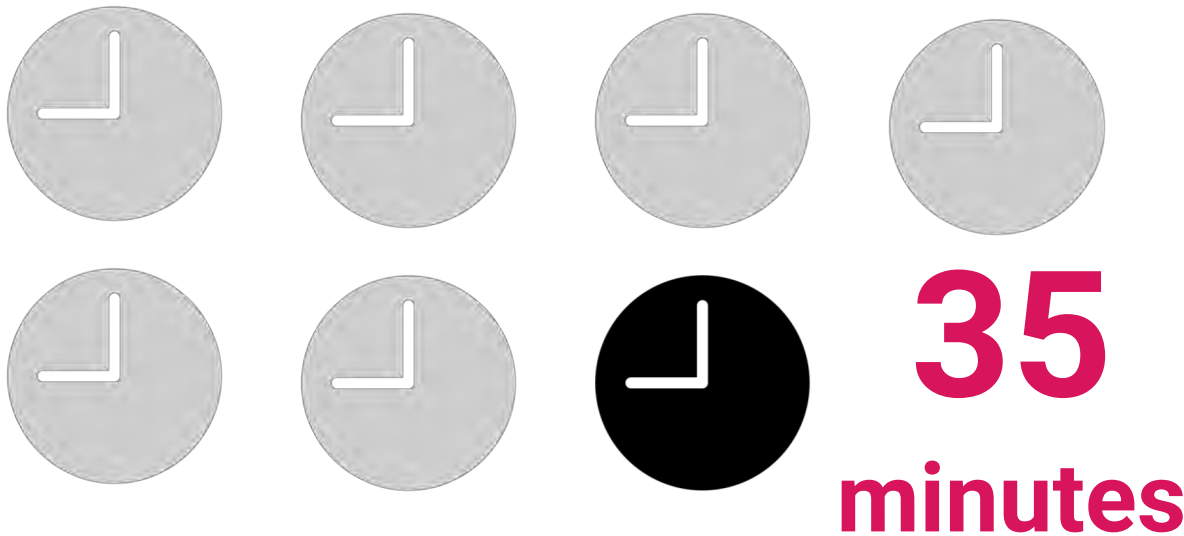
Massachusetts Ave @ Library Way to  
Massachusetts Ave @ Magoun St

Time of the Day

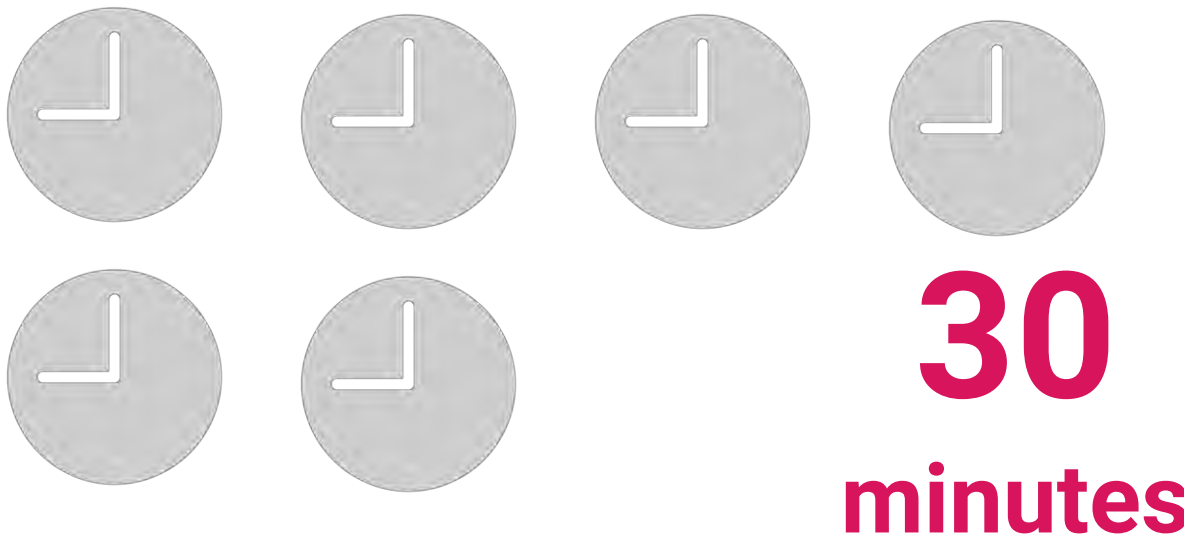
Entire Route

Pilot Area

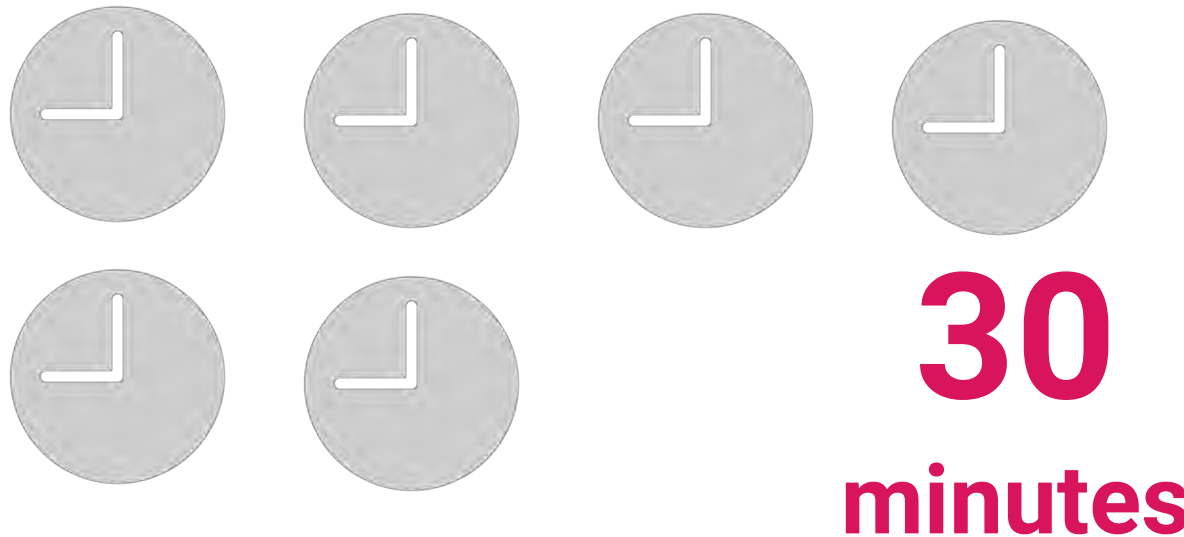
7:00 am – 9:00 am



9:00 am-4:00 pm



4:00 am-6:00 pm

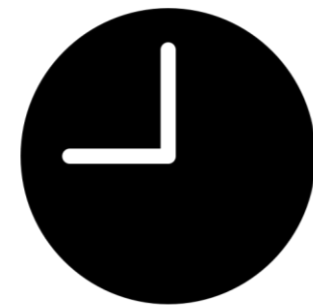




# Travel Time Variance

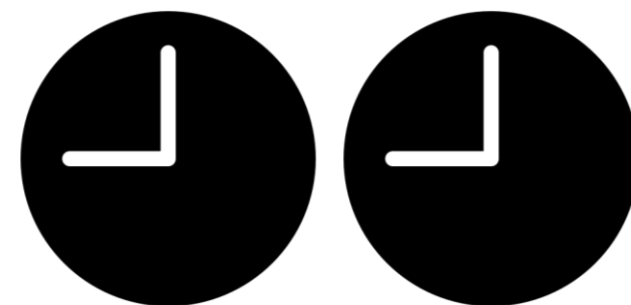
Inbound minutes between  
scheduled and actual  
departure times

**50<sup>th</sup>** Percentile



**3-5** minutes  
behind schedule

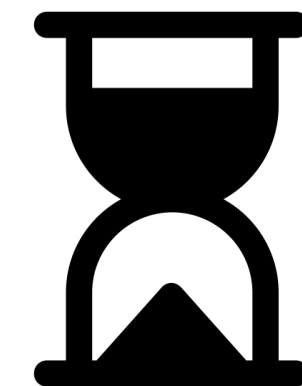
**90<sup>th</sup>** Percentile



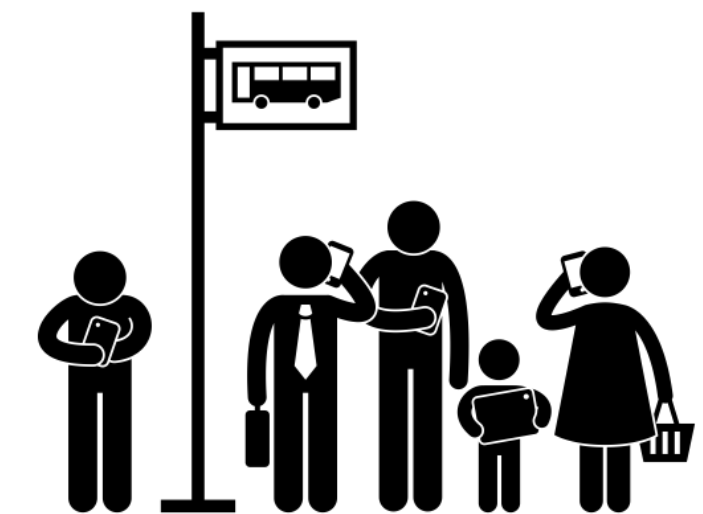
**10-20** minutes  
behind schedule

## Causes

- **Long Wait Times**



- **Overcrowding**



- **Bus Bunching**



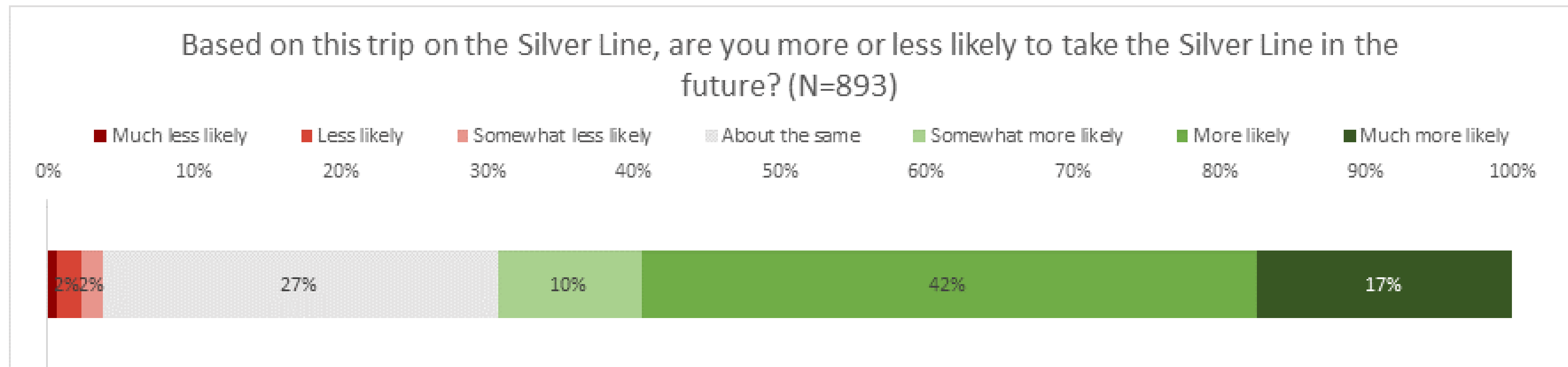


# Evaluation Measures: Perception

- **User Satisfaction**

- 65% of respondents report their trip being at least somewhat faster than usual
- 70% of respondents report being at least somewhat more likely to use the Silver Line as a result of this trip

- **Transit Rider Satisfaction**





# Evaluation Measures: Perception

- **General Perception**
  - Social Media
  - Website Click Rates
  - ...by ALL groups





# **Overview of Transit Signal Priority**

**Wes Edwards, MBTA**





# Many modes – Limited Street Space





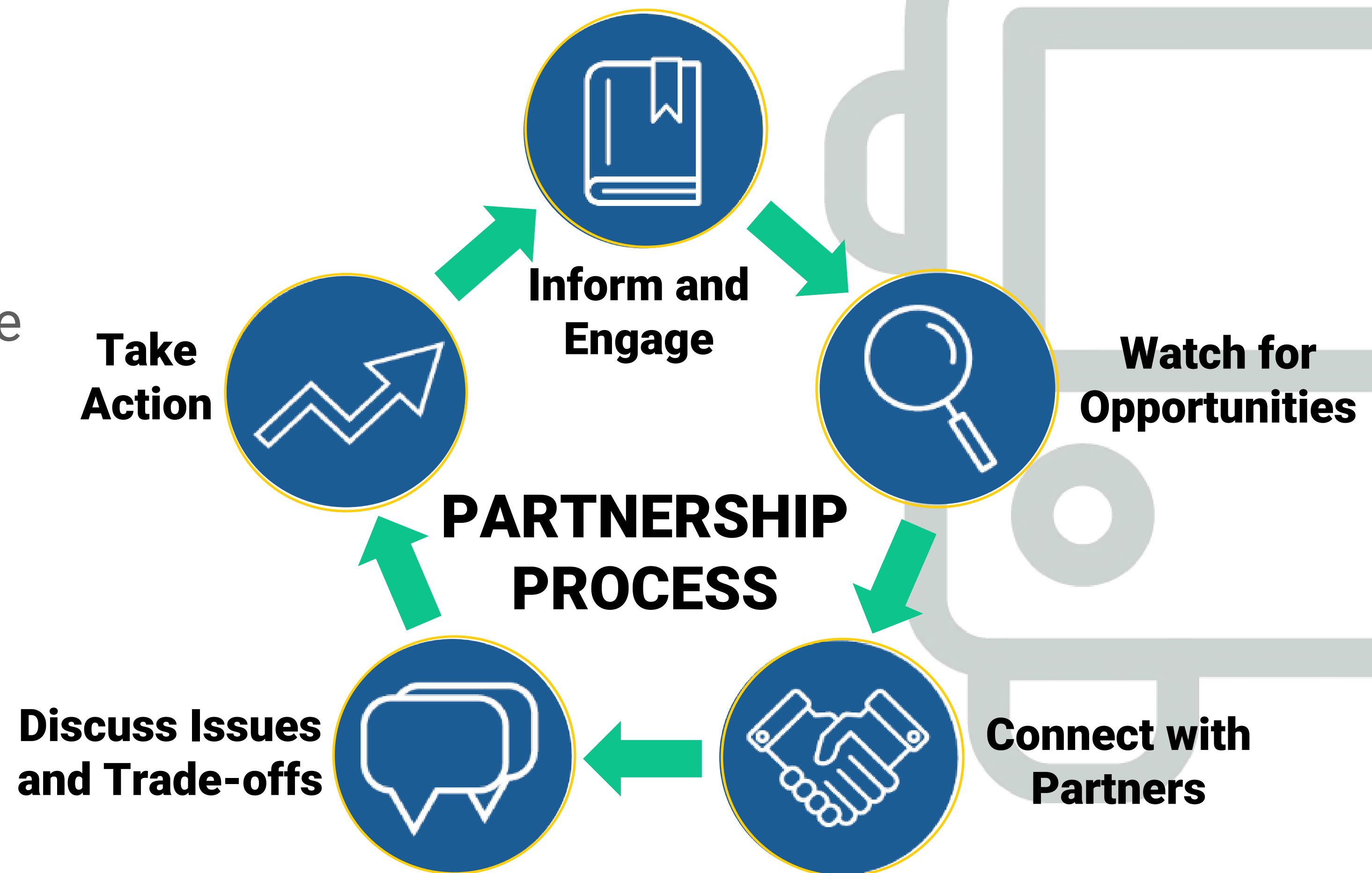
# Improving bus service with municipal partnerships

## What the MBTA can help with:

Buses, bus stop placement guidelines and management, bus schedules, fare payment structure

## What municipalities can help with:

Streets, signals, parking, curb management, sidewalk space, Intersections, enforcement





# Partnership Examples to Improve Bus Speed and Reliability

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## Bus Operations tools

- Stop Relocation
- Stop Consolidation
- Route Design

## Infrastructure tools

- Turn Radius Improvements
- Bus Bulbs
- Roadway  
Channelization/Signage

## Traffic Control tools

- Transit Signal Priority
- Lane Restriction/Exemption
- Queue Jumps

## Transit Lane tools

- Curbside bus lane
- Queue bypass (short bus lane)
- Center bus lane





# What we consider before making changes

<b>Accessibility</b>	Does it meet ADA and MBTA bus accessibility requirements, increasing access and safety to those riders with limited mobility?
<b>Speed and Reliability</b>	Does it improve speed and reliability of the bus system?
<b>Parking</b>	What is the impact on parking and how do we minimize negative impacts?
<b>Safety</b>	Does it address existing safety concerns or maintain a safe environment?
<b>Customer Comfort</b>	Does it improve the customers experience by providing new amenities or making it more comfortable to use transit?



# Transit Signal Priority (TSP)

**Reduce time buses stop at traffic signals by:**

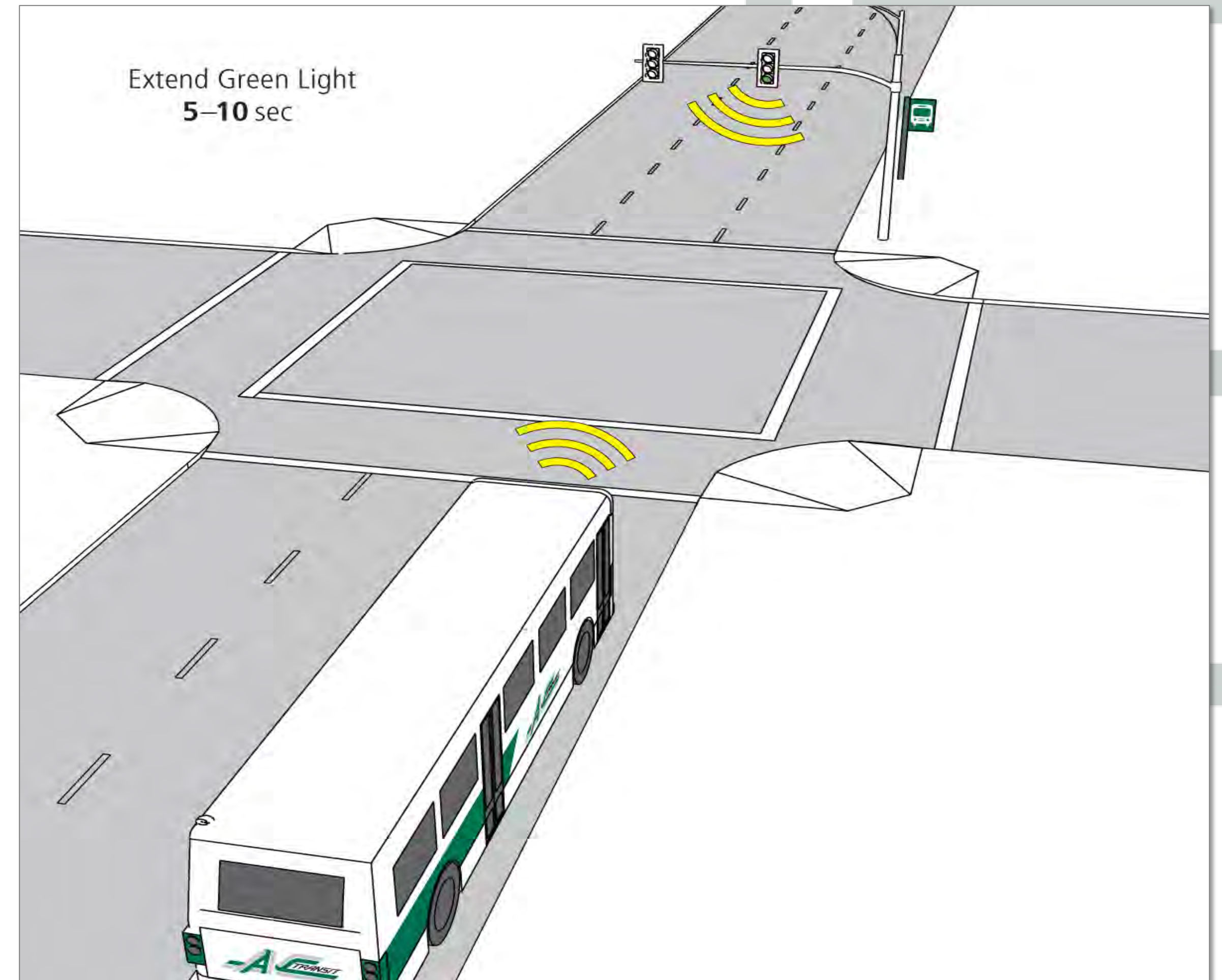
- Extending green signal at end of phase
- Giving green signal early at start of phase

**TSP impacts:**

- Improve reliability
- Reduce travel time
- Increase capacity

**TSP outcomes:**

- Better service for current riders
- Attract new riders





# TSP Pilot Strategy



**Develop TSP software  
and pilot on individual  
signals**

## **TSP pilot corridors:**

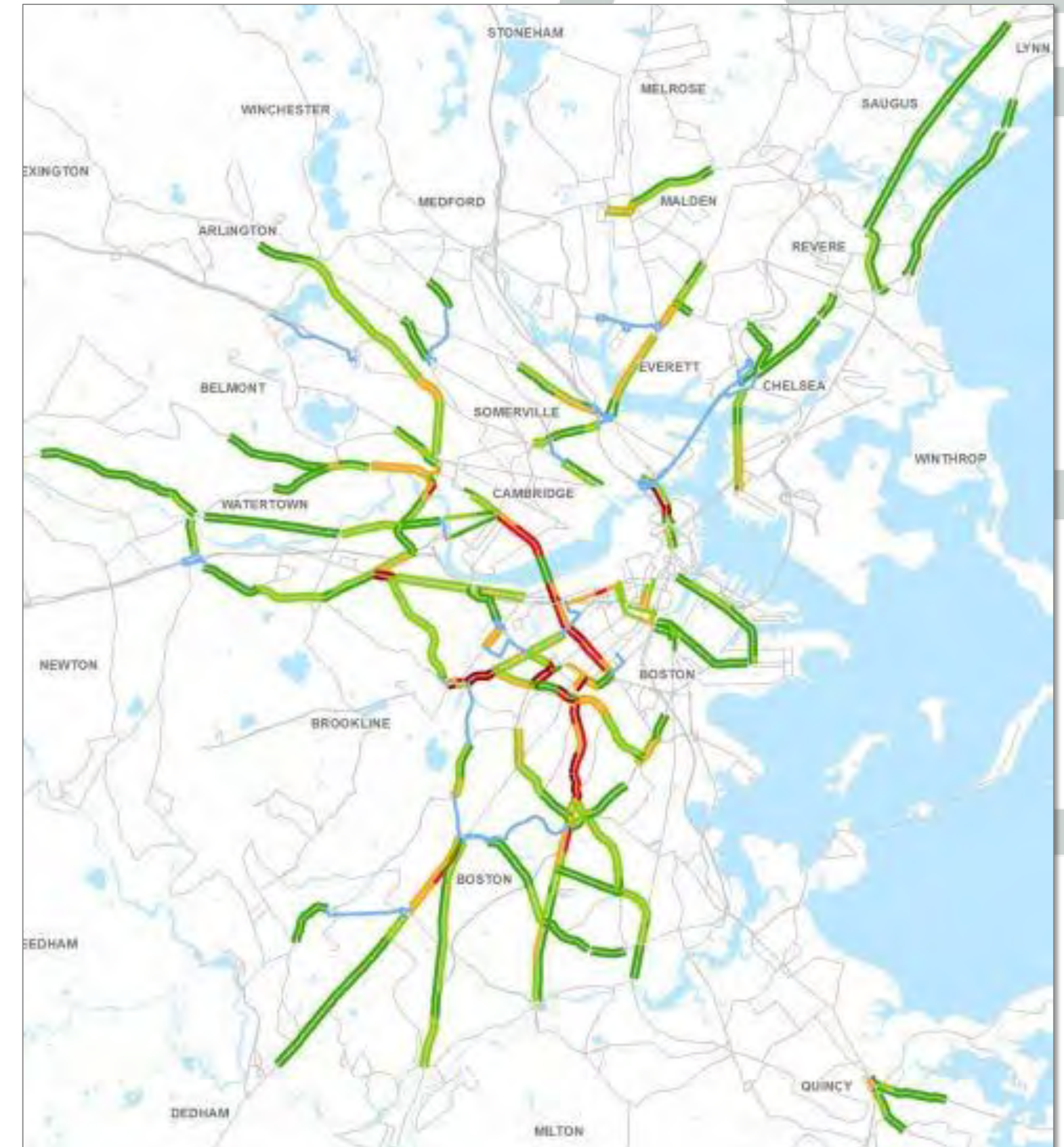
- Beacon Street, Brookline
- Commonwealth Avenue, Boston
- Huntington Avenue, Boston
- Massachusetts Avenue, Cambridge
- Mt. Auburn St.,  
Cambridge/Watertown
- Massachusetts Avenue, Arlington

**Roll out to  
high ridership  
corridors**



# Future MBTA TSP Program

- Focus on high-ridership, high-delay corridors
- “Piggyback” on other traffic signal projects to add TSP
- Emphasis on municipalities eager to partner
- Concentrate on candidate corridors for dedicated bus lane





# Questions and Answers





# Participation Rules

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- Assemble at mic for questions
- Please introduce yourself (name and affiliation, if any)
- What questions do you have about the BRT pilot or process?
- Use brevity and respect time
- Express disagreements or concerns respectfully

**Details about the Arlington BRT pilot will be discussed at the next forum.  
Please submit specific suggestions about the pilot on a comment card.**







# Thank You

**Ali Carter, Town of Arlington**  
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**781-316-3095**

**Julia Wallerice, ITDP**  
**[julia.wallerice@itdp.org](mailto:julia.wallerice@itdp.org)**  
**212-629-8001**

**Ralph DeNisco, Stantec**  
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**617-222-6280**